The Electrical Review

VOL. CXVI. FEBRUARY 15, 1935. No. 2986.

THE OLDEST ELECTRICAL PAPER. ESTABLISHED 1872.

Published every FRIDAY, Price 6d.

THE ELECTRICAL REVIEW, DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1.

Telegraphic Address: "AGEEKAY, WATLOO, LONDON." Code, A B C. Telephone No.: Hop 3333 (50 lines).

The "Electrical Review" is the recognised medium of the Electrical Trades and has by far the largest Circulation of any Electrical Industrial Paper in Great Britain.

SUBSCRIPTION RATES, Postage Free: United Kingdom, £1 14s. 8d. Canada, £1 12s. 6d. Colonial and Foreign, £2 1s. 6d. per annum. Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW, LTD., and crossed "Lloyds Bank."

Index to Advertisers—See page lvi.

Principal Contents:

	PAGE
An Electrical Jubilee	221
Jubilee Lighting Installations. By H. Marryat	223
Compliance with the Regulations	224
The Royal Jubilee	225
Equipment for the Celebrations	229
The British Industries Fair	235
The I.E.E. Dinner	238
The E.R.A. Luncheon	238
Meetings and Discussions	240
Correspondence: Stray Current Electrolysis; The Consumer's Meter; Earth Leakage Trips; Electrical Accidents; The I.E.E. Regulations and Water Heating; Travelling Showrooms; The Heating of Steel Tubes	243
Parliamentary News	245
In the Courts	245
Business and Industrial Notes	246
Electricity Supply	250
Traction	252
Communications	252
Contract Information	253
Notes	254
Our Personal Column	255
New Companies Registered	256
Returns of Electrical Companies	257
City Notes	257
Published Specifications	259
New Work for Contractors	260

An Electrical Jubilee

AS more and more becomes known regarding the programme of official events in connection with the Silver Jubilee of His Majesty King George, interest in the subject of electrical illuminations and decorations rapidly increases.

Immediately it was announced that the event was to be celebrated with the customary pomp and circumstance throughout the Empire, the ELECTRICAL REVIEW stressed the greatness of the possibilities that lay open to the electrical industry. The memory of the great achievements of electricity when the illumination art was twenty-five years younger was quite sufficient to justify the most optimistic forecasts of what the celebrations of 1935 might mean to all interested in the provision of equipment, the installation of public and private work, and the supply of electricity, if we were to ensure electrical effects, on our much advanced lines, suited to an occasion of widespread rejoicing.

For several months past we have been in and out amongst manufacturing, contracting and supply authorities collecting information regarding their plans for meeting the requirements of the public, and we devote a large part of the present issue to placing before our readers the result of these investigations. The publication of this special material comes peculiarly appropriately this week, in view of the announcement of the Royal plans on Tuesday last.

We are glad to report the presence of a more general electrical interest and activity than were in evidence a few weeks ago. At first the importance of the subject seemed not to be appreciated, or, at any rate, save in a few exceptional cases, it excited little enthusiasm. This attitude has, however, disappeared, as our articles show, although we feel compelled to say that if electricity is to derive all the benefit possible the movement now begun must spread rapidly during the next few weeks. If it does not we may, as on other occasions, have to face rush conditions, shortage of supplies, lack of suitable workmen, sacrifice of good work, and disappointment, at the very last minute.

In less than three months from this date, both here and throughout the overseas Dominions and Dependencies, the celebrations will be in full swing. Of course, there are parts of such work as we shall secure which inevitably will fall to the closing weeks of April—a good deal of actual installation work cannot be carried out until then or the early days of May—but the preparation of schemes, types of decorative devices, signs, and so on, is a matter of urgency, as is also the rendering available of all kinds of electrical material. It is very desirable that orders for floodlighting and other equipment should be placed immediately.

The electrical contractor must be ready with his plans for executing, through a suitable staff, an exceptional rush of profitable business, both large and small, over a brief period. If he is wise he will not think only of big building displays, but of the small electrical jobs that will arise for the illumination of private houses and gardens—a class of work not to be despised.

One wonders whether there will be enough qualified wiremen and assistants to go round during several weeks, but thought will have to be given to these matters by the E.T.U. and the E.C.A.

Sign-makers have been working at high pressure for some time past meeting rapidly growing general demands; they are now called upon to meet Jubilee business in addition. Manufacturers who were early at work with plans to meet export requirements for devices and material may reasonably expect success to follow their efforts.

What seems to be needed more than anything else now, according to our information, is a general move forward by municipalities in approving schemes, and by electricity supply undertakings and manufacturers in adopting co-operative plans for the provision of equipment. Both interests should go as far as they possibly can in offering inducements to the public to take special Jubilee supplies.

Yorkshire Power

THE improvement in industry in the area of the Yorkshire Electric Power Company is more substantially reflected in the increase in units sold than in the advance in profit. Consumers took close upon 269 million kWh during 1934, as against 236 millions in the previous year, and there were sold to the Central Electricity Board 149¼ million kWh, as against 143¾ millions. With this great increase of output (approximately 5½ millions) the advance in net profit would, in the ordinary course of things, have been substantially more than £6,277 (£445,942 for 1934, and £439,665 for 1933). Two main factors have combined to produce this result—reduced charges to consumers and increased payments for rates. In the revenue account rates and taxes are £28,720 higher, and an item of £20,000 appears for contingencies, the latter not figuring in the 1933 accounts. The employés pension fund came into operation in January this year. The company has much development work in hand about which the chairman will doubtless have something to say at the annual meeting at Leeds next Tuesday. Once again the directors have issued to shareholders, along with their report, some good illustrations relating to the technical side of the company's activities. This time it is devoted to the great revival of the British steel industry in 1934, and depicts the various electrically operated equipment used therein. A reproduction which appears on a later page may serve to show other authorities the way.

Publicity for London

As is not unusual at this time of the year, one hears a good deal of criticism just now of the lack of electrical publicity propaganda in the Press. When E.D.A. was reorganised some of us had visions of millions of the public being reached by means of plenty of newspaper advertising with a real punch behind it. We have no desire to undervalue the film activity and the more serious extended operations of the Association in some directions, but we are afraid that our feelings of disappointment are shared by many of our readers who expected something greater. Whatever may be happening in some parts of the country, London electricity does not seem to shine very brilliantly beside the efforts that are being made at such expense by gas interests. In the London area, with the eight millions of people, half of whom, we suppose, read one or other of its newspapers, the many electricity companies and other authorities might be expected to make a stronger appeal than they do. We can hardly think that they feel that they are doing their duty. Something more may happen when the London companies get together, but we should like to see evidence of a more aggressive electrical publicity movement in this area right now.

The London Power Co.

IN his address to the shareholders of the London Power Co., Sir Francis Fladgate showed that the linking up of his power stations has, during the past eight years, reduced the bulk cost to the constituent companies from 0.983d. to 0.519d. per kWh. Part of this saving must be attributed to Battersea, where Dr. S. L. Pearce has obtained a thermal efficiency of over 28 per cent. Sir Francis also referred to the improved reliability secured due to interconnection, not only in their own group but in the maintenance of supplies, *via* the grid, to other undertakings. This is, perhaps, not appreciated by the public, influenced by the prominence given in the Press to the breakdown one Sunday in July last. Inter-working between a concern responsible for one-tenth of the energy generated in the whole country and the Central Electricity Board (which absorbs nearly one-quarter of its output) has naturally involved some technical difficulties, but the company has no misgivings regarding the co-operative ability of the engineers of both parties to overcome these. The greatest difficulty lies in a fair apportionment of the working costs, the company claiming that too great a proportion of the benefits due to its large-scale operations accrues to outside undertakings. Thus the operations of the company bring advantages to many more people than statistics of its own consumers would indicate.

Telephone Progress

ONE section of the electrical industry should be pleased with itself these days—that dealing with the manufacture and supply of telephone equipment. The policy of the Post Office during the last year or so has been a very active and progressive one, and the number of telephones is going up at an unprecedented rate. The percentage increase in the London area during 1934 was twice that recorded for the preceding year, although the new rates and conditions only came into force on October 1st. The report for the Manchester area shows corresponding progress. These more favourable terms are still having a remarkable effect upon telephone business, and Sir Kingsley Wood, the Postmaster-General, estimates the capital requirements during the forthcoming financial year at 9½ millions sterling. We are glad to hear that the engineering staff is to share in the improved results.

Floodlighting

THE floodlighting of buildings will probably be even more prominent a feature of the Jubilee celebrations in May than it was during the Faraday Celebrations nearly three-and-a-half years ago. Coloured illumination of façades presents greater scope than it did then, as the tints can be obtained from the use of different gases in hot-cathode lamps at an efficiency up to six times as much as that achieved with the filament lamps and colour screens. It is a good omen that Mr. W. Ormsby Gore, the First Commissioner of Works, showed himself so fully aware of the possibilities of floodlighting when he spoke at the dinner of the Illuminating Engineering Society. His scheme for the lighting of the timber roof of Westminster Hall should provide a worthy example of what can be done in this way. Floodlighting should not be regarded merely as a means for providing occasional striking demonstrations, but also as a method of enabling many people who have no opportunity of seeing them by day to appreciate the architectural value of good buildings.

The Fair

ON Monday next the London Section of the British Industries Fair at Olympia and the White City opens its doors. Again very good displays have been arranged, and the reports indicate that a large number of overseas buyers intend to pay visits, and, we hope, place substantial orders. Of course, from the electrical point of view Birmingham, not London, is the centre of attraction. Nevertheless, there is a good sprinkling of firms who are displaying electrical or kindred products, and a review of these exhibits is included in this issue. We take this opportunity of reminding our overseas readers that the Birmingham Fair, in May, will be well worth a visit, and they should make every effort to get home for this event and the Jubilee celebrations which immediately precede it.

Street Lighting Change-overs

THE progress being made in the electrification of street lighting was the subject of editorial comment in our issue of January 4th. The latest development is that the County of London Electric Supply Co. has followed up its good opening of the New Year, when it converted 720 lamps in Romford, by entering into a contract with the Coulsdon and Purley U.D.C. to supply electricity for lighting the whole of its seventy-three miles of highways hitherto lighted by gas. The introduction of the electric-discharge lamp has given a healthy stimulus to progress, and 900 of the 1,300 lamps included in the agreement are to be of this type.

Jubilee Lighting Installations. By H. Marryat

The effect of the new Wiring Regulations on temporary arrangements

CONTRACTORS are already busily engaged in preparations for the forthcoming Jubilee celebrations, and are discussing ways and means for contributing to the illuminated fairyland which is to be a feature of the event. Some orders have already been placed, and in one instance at least a rehearsal upon a big scale has been carried out, but in spite of all this it is unfortunately true that the bulk of work to be done will not be authorised before the last few weeks, so that those who have not laid their plans well beforehand will find it both difficult and expensive to avoid serious disappointment for their clients.

A primary consideration must be the effect of the new (10th Edition) I.E.E. Wiring Regulations upon temporary installations of the class involved. Already a good deal of misunderstanding has been expressed on this subject, but a careful reference to Section 5 of the Regulations (Regs. 501-507) should make the position quite clear.

So long as the contractor is satisfying the insurance company, the supply undertaking and any local or other authority concerned, he has very considerable latitude in regard to any installation which is not intended to remain in service for a period of more than three months, a condition being (Reg. 501) that the installation shall be maintained in such a manner as to avoid incurring the risk of fire or shock, having regard to the conditions of erection and use.

This condition of avoiding risk throws a great deal upon the contractor's judgment. Whilst it gives him the widest opportunity of economising in both material and labour when conditions justify it, it places upon him a responsibility for any accident arising out of a departure from the regulations affecting permanent installations. Further, to emphasise this responsibility, Regulation 504 provides that every such installation which is not an addition to a permanent installation in a private dwelling house shall be in the charge of a competent person who shall accept full responsibility for it, and the name and designation of this person must be prominently displayed in the vicinity of the main controlling device.

[*Elliott & Fry*

Mr. H. Marryat, M.I.E.E., M.I.Mech.E., is President of the Electrical Contractors' Association

The regulation does not say that the competent person must live on the job, but obviously he would need to do so for his own peace of mind if any part of the installation were liable to cause danger of fire or shock in his absence. Supposing he were satisfied in this respect, he might, presumably, be a contractor residing within easy reach, or he could be any employé engaged in the building competent to give the installation any attention it might require to ensure safety, and willing to accept the responsibility.

Loading and Control

Regulation 502 provides that the installation must be adequately protected against overload, and must be controlled by a conveniently situated switch or "other effective means" whereby all poles or phases of the supply, including the "middle wire," "common return" or "neutral" can be disconnected from the installation. "Other effective means" would, of course, include a circuit-breaker, but it is doubtful if any device less expensive than an ordinary switch would satisfy the "responsible person" with regard to safety. This regulation also requires that a temporary installation which is an addition to a permanent installation must be connected at such a point as not to overload any part of the permanent installation. Although not definitely stated, it must be assumed that for this purpose the current-carrying capacity of the permanent installation must be calculated strictly in accordance with the regulations which have been laid down for permanent work.

Regulation 503 deals with the use of bayonet-socket lampholders and prescribes a maximum load not exceeding 1,000 W upon any final sub-circuit upon which these are employed, and to conform with Regulation 505, cables must be of the v.i.r. type, either taped and braided, or protected with tough rubber compound. Metal-sheathed cables must not be used. If the cables are enclosed in conduit, Regulation No. 408, which comprises fifteen paragraphs and nearly all the requirements for permanent conduit work, comes into force. It is likely, therefore, that for temporary installations conduit will be avoided, and, in order to ensure reasonable safety, no doubt a tough rubber cable protection will, in most cases, present the best proposition.

The Regulations do not preclude the possibility of employing used cable, but No. 505 insists that the insulation shall be in good condition, that the joints shall be as few as practicable, and that they must be mechanically and electrically sound. Flexible cords (Reg. 506) may only be employed where essential, and, in any case, must be of the high-insulation type specified in Regulation 1311. If exposed to mechanical damage, flexible cords must be either tough-rubber protected, or of the braided and compounded class. The wisdom of insistence upon the use of high-class flexibles, and these only where necessary, in temporary installation work will be immediately appreciated.

All temporary installations must be tested before being put into service (Reg. 507), and must comply, as regards insulation, resistance and earth continuity, with the requirements (Section 11) for permanent installations. The foregoing paragraphs comprise the whole of the requirements for temporary installations which, for the Jubilee illumination work, will probably fall into one of the following classes: Floodlighting; striplight designs and bulb-illuminated devices; and neon displays.

Floodlighting—Good and Bad

Floodlighting presents the advantage that the plant can be readily removed and stored for use upon a future occasion, when the units can, if necessary, be rearranged to suit another site without loss of capital, whereas other systems of temporary illumination usually result in the scrapping of much of the material after use. The system is applicable to the illumination of trees, gardens, waterfalls and any class of building, while the variety and beauty of the effects obtainable cannot be appreciated before they have been seen.

The art of effective floodlighting requires as much of the artist as of the engineer in its planning. Generally, when dealing with buildings, the effects of light and shadow designed by the architect to give a beauty of variety and rhythm to a façade lighted from the sun or sky, are reversed; it is therefore very obvious that crude and incongruous results will be obtained unless the artist takes a hand in arranging the position of light sources and the direction and extent of shadows.

As with all things which can be good, floodlighting can also be bad, and probably will be so if the layout is not specially considered with regard to the particular subject to be illuminated. In the case of a building, the salient architectural features must first be considered and the scheme designed to characterise these; otherwise a "flat" effect will be obtained, giving the subject a photographic appearance. Hard shadows should be avoided, as detrimental to a pleasing effect. This is particularly important in installations where the projectors are fixed on the ground level, so that there is a tendency for hard shadows to be thrown upwards from window copings, sills and other projections.

When flooding the exterior of a building it is important to ensure that the angle of reflection from any glass is such as not to produce glare at any point of observation. Windows may be fitted with temporary outside blinds, and if there are people working or sleeping within, outside blinds must be provided or inside blinds drawn. Direct glare from projectors must be avoided at all costs, so these cannot be placed in any position from which the lamps or lenses can be seen. Stray light should be reduced to a minimum by means of screens. In the ideal installation the cut-off is very sharp, so as to render the light sources invisible from all viewing positions.

The Use of Colour

If colour change is required flicker is to be avoided and it is best done by means of a motor-driven dimmer which can be set so as to pass slowly through a continuous series of colours. Such installations are expensive, owing to the duplication of equipment for each separate colour, but when well carried out the results are very effective, particularly when used for such natural subjects as trees, cliffs, rocks, lakes and waterfalls.

In designing colour floodlighting schemes, careful selection of colour screens is important, as deterioration ruins the effect. An advantage of coloured discharge flood-lamps is that screens are not needed and the colours are permanent. Apart from colour-changing, delightful effects may often be obtained by picking out a particular part of a building in a fixed colour

differing from the lighting of other parts of the same building. In the selection of such combinations, the engineer will be well advised to draw upon the artist for advice.

The contractor installing temporary floodlighting should bear in mind that these installations have a way of becoming permanent after the occasion has passed. Once the owner of a beautiful building has seen its night appearance under floodlights, he is usually loth to have the system dismantled, and will approach the contractor with a view to its being made permanent. In such a case foresight will save subsequent expense. When an otherwise permanent installation is required for use on occasions only, it is best to install permanent distribution plug boxes and arrange for the projectors, each with its own coil of cable, to be portable and suitably stored when not in use.

A point of practical importance is accessibility for cleaning and maintenance of the projectors, as efficiency is rapidly lost under a deposit from town atmosphere if regular cleaning is not maintained. The cost of such work is considerably reduced if the lamps are easily "get-at-able."

Striplighting and Set Pieces

Manufacturers specialising in material for festive illuminations issue catalogues comprising a large selection of various colours and combinations of colours forming crowns, flags, royal arms, etc., and these may be purchased in various sizes wired up complete and ready for connection to the supply mains. In these set pieces low-voltage lamps are usually employed, arranged in series, and for this reason it is advisable that a good quality lamp be used as the failure of one will put the series in darkness and may seriously affect the appearance of the display.

Special designs may be obtained made up complete from manufacturers engaged in this work, or may be constructed by the contractor himself, provided he is careful to employ only materials of a fire-resisting nature to the satisfaction of the authority concerned and assemble them in a manner to resist weather and offer no risk of "shorting" or undue heating. As a backing, either papier maché or metal may be used; the former is non-inflammable and quite suitable for withstanding wind and rain for comparatively short periods.

It may seem unnecessary to stress the importance of finding a secure fixing for devices of this nature, but a survey of such temporary installations after an unexpected gale has shown that a little extra trouble spent in fixing at the outset may avoid much disappointment. Care should be taken to ensure that any flags or other fabrics used in connection with the display are properly treated for outdoor use, as nothing looks worse than materials in which the colours have "run" or faded.

Material for striplighting may be purchased by the yard, complete with lampholders and lamps of any colour desired, and may be worked into designs upon suitable battens or hung in festoons. It must be remembered that when installing either striplighting or any of the devices referred to above, if bayonet socket lampholders are employed, Regulation 503 (which limits the total load on a final sub-circuit to 1,000 W) comes into force; it is therefore advisable to use screw lampholders.

Neon Tube Displays

The neon display, as usually understood, is not used so much as the lamp sign for temporary work. This is chiefly on account of its comparatively high cost, and because the best and most dignified type of neon display is essentially permanent. Neon sign manufacturers, however, have available stocks of standard letters, curves and outlines which may be used in some cases. These are complete self-contained units with the tube and transformers mounted in sheet-metal cases, so that all high-voltage work is enclosed in metal ready for the low-voltage leads to be attached.

Most local councils will insist upon the use of a fireman's switch outside the premises upon which any neon signs are erected. There is, however, no objection to the contractor making this switch his main isolating device, under the regulations for a temporary installation, so long as he attaches thereto the name and designation of the competent person responsible.

In the general striving after effect which is sure to develop as the Jubilee season draws near, there will probably be some freak installations such as sky lighting and smoke lighting. These have their publicity value, but differ fundamentally from all other displays inasmuch as they are quite unsuitable for subsequent permanent use, and, in any case, would probably be too expensive to be retained in operation.

The contractor approaching such projects will bear in mind that he may have no use for the equipment afterwards, and will therefore make sure that his costs are covered in the first place.

Compliance with the Regulations

A LARGE proportion of the installation work carried out in connection with the Jubilee celebrations will be new. The Electricity Supply Regulations issued by the Electricity Commissioners for securing the safety of the public lay down the conditions to be observed before a supply can be taken from the public mains.

Thus a supply cannot be obtained if the leakage current exceeds one ten-thousandth part of the maximum current required for the installation. It is open to the undertaking to refuse to give a supply unless the conductors and apparatus are large enough for their duty and are constructed, installed and protected so as to prevent danger. Every distinct circuit must be protected by a fuse or circuit-breaker of adequate rupturing capacity suitably situated and of such construction as to prevent the risk of overheating, arcing or scattering of hot metal, and the fuses must be renewable easily and without danger.

It is also possible for the undertaking to decline to connect an installation to more than one outer or phase conductor unless the supply terminals at 250 V (or less) are arranged in separate pairs so as to prevent the risk of shock at more than 250 V. The wiring from each pair of 250-V terminals must be kept separate, except when completely enclosed in strong metal casing that is electrically continuous and properly earthed or is so constructed, installed and protected as to prevent danger.

In any room containing circuits fed from different outers or phase wires, apparatus connected to one of the circuits is required to be fixed not less than six feet away from apparatus connected to another circuit. As an alternative, the metal framework of all the apparatus must be earthed, and the flexible conductors attached to portable apparatus must be protected against mechanical damage. If the flexible cable is protected by a metallic covering, this covering must be earthed but is not to be the only connection of the metal framework to earth.

Three-phase Supplies

A three-phase or three-wire supply cannot be obtained for 250-V installations unless its capacity exceeds 15 kW, and then only if the use of a single-phase or two-wire service would cause a voltage variation which would be more than 6 per cent.

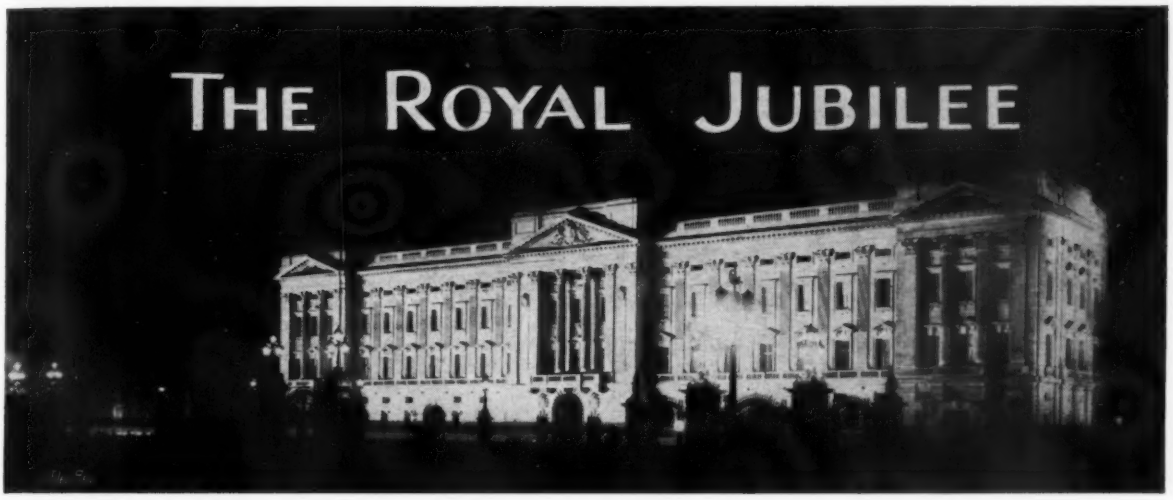
A consumer is not entitled to require a supply to be given for transforming to a higher voltage for a luminous tube sign on the outside of any premises unless switches are provided on the low-voltage side of the transformers both inside and outside the building. It is stipulated that these switches should be readily accessible and easily operated without danger and so connected in circuit that they cut off all high voltage from the sign or any apparatus associated with it. High-voltage conductors must not be normally exposed to the touch, but are to be completely enclosed in electrically continuous metal, which shall be earthed and protected against mechanical damage if necessary to prevent danger. Some point of the lower-voltage transformer system should be earthed to guard against leakage from the high-voltage side.

Arrangements for Maintenance Work

Unless the whole of the conductors and apparatus can be made dead at the same time for cleaning or working upon they must be so arranged that they can be made dead in sections that are separated from all adjacent live metal. Means must be provided for preventing the public or unauthorised persons having access to the high-voltage circuits.

The above represents the minimum permissible legal requirements, but the Electricity Commissioners specify in each case that installations that comply with the Regulations for the Electrical Equipment of Buildings issued by the Institution of Electrical Engineers fulfil all obligations. It should be borne in mind that the I.E.E. Regulations specify requirements for the construction as well as the installation of apparatus, which should therefore be obtained only from British firms of repute.

In his article Mr. H. Marryat deals with the more important I.E.E. Regulations relating to the type of work required in connection with the Jubilee celebrations and observance of the points he mentions will save a good deal of trouble to those responsible for carrying out the work. Notice of the intention to install electrical equipment should be given to the fire office with whom the premises are insured, as well as to the supply undertaking.



Buckingham Palace floodlighted [*Electrical Review photograph*

IN the course of an illustrated review of the electrical illumination arrangements which were made at the time of the coronation of King George V in the year 1911 we referred to the very heavy pressure under which electrical contracting and other concerns had to work for several weeks in advance of the event. There is little doubt that the same state of things, and possibly in a more acute form unless special foresight is shown, may be anticipated on the occasion of His Majesty's Silver Jubilee in May next.

The article to which we allude appeared in the ELECTRICAL REVIEW of June 9th, 1911, and it makes extremely interesting reading to-day. For example, it commented upon the advance that electrical illumination had made in the public favour since the coronation of King Edward VII in 1902. If we were justified in expressing gratification at the advance that had happened between the years 1902 and 1911, we certainly are entitled to-day to claim for electrical illumination that the twenty-five years of His Majesty's reign have brought about many remarkable changes technically, and wonderful progress generally. We think that there is ample reason for looking forward confidently to parts of London and practically every important city or town and health or holiday resort both in the provinces and around the coast, being transformed into veritable fairylands. In addition there will be great activity of the same kind in the Empire generally, which should mean a healthy export demand for suitable classes of electrical products.

A design by Siemens Electric Lamps & Supplies, Ltd.

During several years electricity has been rapidly growing in favour for the beautifying of public and other buildings, and some thoroughfares are already so brilliant with floodlighting, and neon and sign lights that there is not likely to be so great a contrast between February, 1935, and May, 1935, as there was between February, 1911, and May, 1911. Preparations are afoot, however, which will ensure that what exists this week will prove to be small compared with what will actually obtain four months hence. Of course, much work that will be done will be carried out expressly for this auspicious occasion and will be of a quite temporary character but it all brings grist to the electrical business mill.

The manufacturers who are ready to meet the demand for the necessary electrical material, the contractors who have to carry out the installation work, the wiremen who are waiting for a job, and the electricity supply authorities who will carry additional load at a period of the year when demand is not at its highest, will all reap an immediate benefit. There should hardly be an electrical contractor anywhere without a certain amount of Jubilee work, and possibly there will be a shortage of competent wiremen, indeed, everything points to the necessity for making plans in good time.

We may expect that a good deal of the work will be of a permanent character. This is definitely stated in connection with some floodlighting schemes. Though the recent official announcement in Parliament stated that the cost of certain floodlighting of important buildings would be borne by the electrical and gas industries, it is absolutely certain that electricity will be so much in evidence everywhere that the objective of the industry to make the public permanently electrically minded will be brought considerably nearer to attainment. This forms a very strong argument in favour of the steps taken by one of E.D.A.'s committees to secure co-operation between manufacturers and electricity supply authorities. We hope that those concerned in this effort will see that there is no lack of the necessary funds in the Association's coffers.

A Good Precedent

Writing in 1911 we stated that there was activity in the factories devoted to the production of the royal monograms, crowns and multitudinous other devices and signs for buildings lining the route of the processions. We added:

"Electricity has won easily in this matter of choice illumination effect, by reason of its safe adaptability amid inflammable decorative surroundings as well as owing to the convenience with which it enables a complete scheme, silently, ladderlessly and without taper, to shine out suddenly in all its beauty. . . . What electricity is doing on a large scale in the streets is but an illustration of its convenience and adaptability in every home and every seaside and holiday and recreation resort in the kingdom. If we mistake not, electricity is going to make a most winsome and graceful appeal to the public, and a grand imposing display worthy of so great an occasion as the coronation of King George V."

We select for reproduction from our issue of June 9th, 1911, the illustration of the "Old Lady of Threadneedle Street" who was "up earliest of all putting on her electric strip attire." The Royal Exchange was then being outlined and festooned with similar material which also entwined the pillars of both of these fine and stately edifices, while the Mansion House and contiguous buildings were following suit. Lombard Street had a bankers' co-operative scheme for a dozen electrically illuminated and choicely decorated arches, and festooning on the buildings on either side of the full length of the thoroughfare, was also in the hands of the electricians.

The Bank of England electrical scheme which we illustrate as an outstanding example of coronation work was carried out by Piggott Bros. & Co., Ltd. The scheme included 5,000 8 c.p. carbon lamps. The City of London Electric Lighting Co. put in three supply mains to feed four main circuits, two on each side of the three-way system. There were 20 ft. golden wreaths, Imperial crowns, sixteen eight-point stars along the top coping, oval medallions, ten electric flambeaux on the top of the building and the whole of the Corinthian pillars were entwined with lights.

The great rebuilding operations that are proceeding at the Bank make one wonder what scheme of electrical beautification will be developed for the Silver Jubilee.

The Advent of Neon

Most of the work done in 1911 consisted of made-up designs with coloured electric lamps wired at the works and hung or erected afterwards. This time in addition to both of these there will be miles and miles of neon tube in varied shapes and to all kinds of designs. Expectations are very high as to the part that neon will play both at home and throughout the Dominions.

A small point, perhaps, but one of importance to many local electrical contractors is the prospect of work in small places or suburbs where on former Royal occasions householders have hung lighted signs and strip figures. A new chance to-day as compared to 1911 lies in the illumination, projector and strip, of private gardens. Many people may, in the circumstances, feel inclined to adopt a small permanent scheme of this kind, but the night-light fairy-lamp on window sill or in cottage gardens will no doubt still be used by the million.

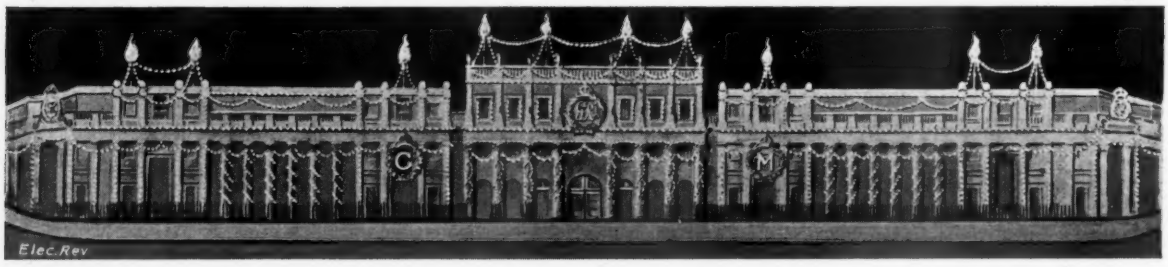
In London the whole question of tariffs for illuminations is in the hands of the London Electricity Supply Association on behalf of its constituent companies. Meetings of the various representatives have been held and particulars of joint action may be forthcoming shortly. The County of London and other companies are participating in the cost of the floodlighting schemes and are acting in co-operation with H.M. Office of Works and the British Electrical Development Association.

Southend's Effort

At Southend-on-Sea, which always includes electrical illuminations amongst its attractions for the season, the authorities have statistics for the last two years showing that they have drawn a large number of visitors to the town. In consequence a demand has arisen for a more comprehensive scheme and the Corporation has decided to extend the illuminations from Shorefields to the Kursaal. At the Westcliff end the scheme will be carried out on the same artistic lines as in the past, and a feature will be some illuminated fountains to be erected on the sea wall. At the east end the illuminations will consist mainly of strip-lighted festoons and pylons. The Shrubbery will be studded with a number of original illuminated animals, arches and other devices.

The total expenditure will be approximately £14,000, which includes the outstanding expenditure on the existing scheme. The official dates of illuminations at Southend are:—King's Jubilee, 4th to 12th May; Yachting Week, 1st to 11th June; Pier Centenary, 24th to 31st July; Carnival and Autumn Illuminations, August 1st to October 20th.

With regard to safety regulations at Southend, Mr. A. C. Johnson, the borough electrical engineer and manager, informs us that all work will be inspected before and after the installation of decorative lighting; the transformers will have a 14-V output and protected terminals, and the wiring regulations for temporary installations, Nos. 501 to 507, will be followed.



The Bank of England illuminated for King George's Coronation celebrations by Piggott Bros. & Co., Ltd., reproduced from the "Electrical Review" of June 9th, 1911

It may be taken for granted that the companies will be ready to grant special facilities to encourage general illumination. So far as the County of London Company's other areas are concerned its associated companies at Bournemouth, Folkestone, Chatham and Deal are represented on committees set up for the purpose of drawing up illumination schemes.

Information received from a number of other electricity supply companies, and municipalities as well, show that while enterprising action was taken early in some places, there are many towns where nothing, or next to nothing, has yet been done. We hope that engineers will promptly bring the matter before their committees if they have not already done so and that their committees will influence their councils so that there may be electrical illuminations, public and private, worthy both of the occasion and of the undertaking owned and worked by them. When corporations, councils, and company directors have resolved generally upon measures to be adopted, expenditure to be incurred, and charges to be made, the engineer and manager and his staff can, if thought fit, proceed to approach consumers, and contractors can launch out on a business-getting campaign. In various towns specially favourable rates are being offered to consumers to induce them to take advantage of the supply already available on their premises for this extra service.

There may be a disposition to underestimate the value of possible business because of the late lighting-up time in the month of May, but displays will be switched on well before that time, in keeping with the spirit that such celebrations encourage, and they will run on well into the early morning hours for quite a number of nights. A national holiday of necessity involves a decreased consumption of electricity in factories and business houses, but elsewhere there will be a fuller use of supply for indoor night celebrations.

In the City of Edinburgh, as Mr. Edwin Seddon, the city electrical engineer, reminds us, it is not dark until about 10.30 p.m. in May. In Bradford lighting-up time will be 9.45 p.m. If shopping-week practice be followed there in respect of jubilee illuminations the charge will be a flat rate of 1½d. per kWh. The municipality will leave the electrical contractor unhampered in securing special work and demand. In Bradford and doubtless in many other places no special safety regulations will be necessary, as all work, whether of a temporary or a permanent character, has to be executed in such a manner as to secure the safety of the inhabitants and the prevention of fire, the City having a private Act giving it appropriate powers.

It may be taken for granted that other coastal resorts, such as Blackpool, Bournemouth, Margate, and so on, will make substantial additions to their general illumination arrangements for practically the whole of the summer season.

Celebrations in Regent Street

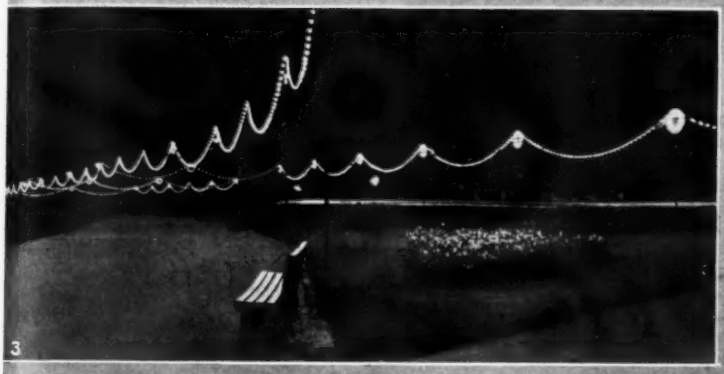
Regent Street, London, is to be floodlighted from end to end, but the scheme will only come into operation in the autumn and will continue for three and a half years. The plan was outlined and unanimously approved at a meeting of the Regent Street Association, Ltd., last Friday, when the cost was given as £6 12s. 6d. per ft. run for ground floor tenants (there is over a mile and a half of buildings), besides which the larger upper floor tenants and building owners will be asked to contribute.

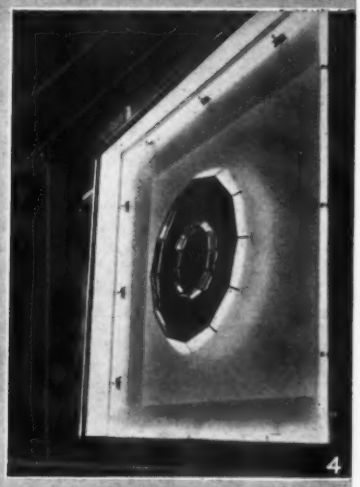
It is proposed to take a supply of electricity (for approximately 1,400 hours a year) from the St. James' and Pall Mall Electric Light Co., Ltd., the arrangement being that the floodlighting will be on every night of the year (except Sundays) from 5.30 p.m. or lighting-up time, whichever is later, until midnight. Altogether there will be something like 1,000 kW of lamps.

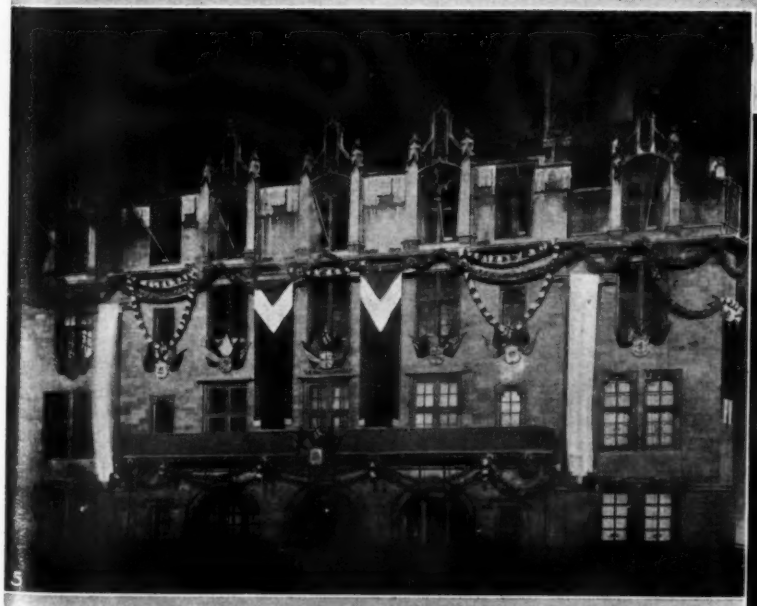
It is proposed that the floodlamps shall be fitted to the buildings on artistic brackets, to be designed by an eminent architect, and there will also be trough lighting above cornices, together with special illumination of the architectural features of buildings. The possibilities of fixing floodlamps on standards at the kerbside, or in the middle of the road, were at first considered. An Act of Parliament is needed for the former, however, and the Home Office objects to the latter.

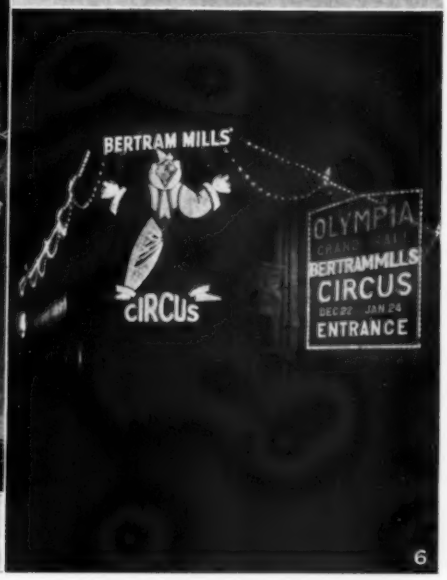
During the meeting a letter was received asking that gas floodlighting should be considered, but it was pointed out that although the Association was not wedded to electricity it was not thought that gas would be entirely satisfactory on account of the heat and fumes.

Schemes of floodlighting have been demonstrated by three competing electrical concerns, and the chairman observed that, fragmentary as these were, they gave some slight hint of the wonderful and magnificent prospect that will be opened out when their beautiful street—all the way from Waterloo Place to All Souls' Church—would "blossom into light at the touch of a switch." Nor would it be just a haphazard blaze of light, but both a scientific and artistic display. It would,









Elec. Rev

Examples of Displays Suitable for the Jubilee Celebrations

1. Floodlighted gardens at Margate. 2. Neon on the Stoll Picture Theatre, London. 3. Festooning on the cliffs at Gorleston. 4. Suggested wall display of tubular lamps. 5. The Middlesex Guildhall floodlighted. 6. Large lamp signs at Olympia.

in fact, be the first time that any street in the world had been treated in this fashion. It would be architectural lighting. The beautiful buildings, with their glory of colonnades, arches, pilasters, balconies and fretted cornices, would be subtly picked out in light and shade.

The Marylebone Borough Council has decided to spend £2,500 upon illuminations and decorations, the scheme embracing Oxford Street, the upper portion of Regent Street, and possibly Baker Street or Edgware Road. The Town Hall will also be lighted, while among the big stores who may be expected to make a striking display Selfridges may, of course, be mentioned. An attractive rate may be anticipated by Marylebone consumers—possibly 1d. per kWh or less—but, as we understand from Mr. C. H. Smyth, the chief engineer, this rate would only be of advantage to the smaller short-hour consumers on the flat-rate for lighting, as the secondary rate on the two-part tariff is either ¾d. or ½d. per kWh.

Cardiff, Hull, and Maidstone

At Cardiff, where a large number of tradespeople avail themselves of the Electricity Department's late shop-window lighting rate of 1d. per kWh, the Committee, we learn from Mr. C. G. Morley New, the city electrical engineer, has agreed to give supplies for illumination and decoration purposes at the power rate (1d.). The Electricity Committee has also offered to floodlight, at its own expense, the City Hall, the Law Courts, and the National Museum of Wales, buildings which are situated in the Civic Centre. On previous occasions at Cardiff, prior to the general adoption of the late shop-window lighting rate, the Department offered similar terms without the installation of special meters by assessing the consumption by agreement with the consumer.

At Hull, Mr. J. N. Waite, the chief of the electricity undertaking, tells us, the existing tariff already makes provision for extended use of electricity in all business premises at the low charge of ¾d. per kWh for all such special business as is anticipated in May. The Electricity Department will make the jubilee event the occasion for providing special features in its showrooms. It is also proposed to offer existing stocks of strip lighting, &c., for hire on the usual terms.

Maidstone Corporation Electricity Department will floodlight certain of the historical and public buildings in the town, while the local gas company is to similarly beautify the Old Tithe Barn. We learn from Mr. E. E. Hoadley, the chief of the electricity undertaking, that energy for illumination purposes will probably be supplied during the whole of Jubilee week at 1d. per kWh. Contractors and consumers will be left to make their own arrangements, and the Department is not issuing any special regulations.

At Hendon the Town Council includes £803 for decorations and floodlighting in its total of £4,200 jubilee expenditure.

At Portsmouth no definite illumination scheme has yet been prepared, but Mr. B. Handley, engineer and manager, informs us that the normal charge for electricity for such purposes as are indicated in the summer months to consumers already taking a supply, would be 0.4d. per kWh.

Great Yarmouth Town Council has formed a special subcommittee to consider special decorations, and the borough electrical engineer, Mr. Percy E. Rycroft, is arranging for electricity for decorative purposes—both public and private—to be available at 1d. per kWh.

Bristol and Birmingham

The Bristol Electricity Department (Mr. A. J. Newman, chief engineer and general manager) is offering a special rate of 1d. per kWh net for temporary illumination purposes between May 1st and July 31st. A condition imposed is that the illumination shall be additional to the normal use and shall *not* be used for advertisement purposes. The supply will be registered through a temporary meter, which will be fixed on payment of a service charge of 7s. 6d. The ordinary regulations for installation work will apply.

At Birmingham, where the City Council last week voted £12,000 expenditure on the celebrations, the floodlighting of a number of the public buildings in the city will continue during the week of the celebrations and the installation will be kept in readiness for starting up again for the period of the British Industries Fair (May 20th to 31st). The actual extent of the electrical programme is dependent upon the degree of co-operation offered by the manufacturers. The Electricity Department is not contemplating any special steps with regard to consumers. Many businesses are sure to embark upon appropriate illumination schemes and the Department, by circulating manufacturers' catalogues and bringing consumers and floodlighting experts together, will materially help the movement.

Croydon Borough Council has sanctioned the expenditure of £2,000 by the Electricity Department on special illuminations.

The newspaper Press reports that a great pageant is being organised by leading London amateur dramatic societies and £25,000 is mentioned as the cost of providing seating accommodation and special lighting.

It is reported that Brighton Corporation intends to floodlight all cliffs to the east of the town, and it is said to be in communication with other coastal towns to see whether they will make similar arrangements.

A circular letter has been issued to local authorities by the Northern Ireland Electricity Supply Board stating that a special tariff of 2d. per kWh has been arranged for illumination supply, and it is expected that most of such bodies will avail themselves of the offer and have electrical displays on their public buildings. The Board is prepared to put consumers into touch with makers of equipment. It is stated that the I.M.E.A. has written to members, including the Belfast Corporation, advising them to secure floodlighting equipment as early as possible, as a great demand is anticipated at the last minute. At Parliament Buildings, Stormont, Belfast, illuminations of a very special kind are expected and tramcars will be decorated with coloured lighting.

Cheltenham Arrangements

At Cheltenham the borough electrical engineer recommends that as the celebrations will take place during a period of light load, a special rate shall be charged for external illuminations and floodlighting, and a charge of 1d. per kWh has been decided upon. The engineer also submitted schemes of illuminations for the Promenade, and pointed out that most of the appliances required would remain available for future festivities or could be hired out on suitable occasions. The Committee authorised him to purchase floodlights for illuminating the Long Gardens, and to lay the necessary cable, and also to procure the materials and lamps for illuminating flower baskets on the lamp standards in the Promenade, at a total estimated cost of £224, such appliances to be hired to the Jubilee Committee at a charge of 20 per cent. of the capital outlay, plus the cost of the labour on temporary work, the electricity used to be charged at 1d. per kWh.

Glasgow Corporation will spend (if the General Finance Committee's recommendation is approved) £30,000 on general celebrations and the project includes "flooding with coloured lights" the Kelvin Hall, the Art Galleries, and the City Chambers.

The London Programme

In London floodlighting will be in evidence on a grand scale. Some months ago the First Commissioner of Works (Mr. Ormsby Gore) was in conference with electrical and other interests with regard to this matter and at the end of January he informed the House of Commons that provisional arrangements had been made to floodlight Buckingham Palace, St. James's Palace, the Admiralty and Horse Guards Arches, the clock tower of the Houses of Parliament, the National Gallery, the London County Hall and Westminster Abbey. Almost the entire cost of this work as well as the floodlighting of St. James's Park, he stated, was being generously borne by the electrical and gas industries.

In a further statement to the House on February 11th Mr. Ormsby Gore said that further arrangements had been made which would provide for the floodlighting of the Horse Guards and the Colonnade of the War Office. The Incorporated Accountants' Hall and H.M.S. *President* were also to be illuminated, and it was further hoped that the New Public Offices, the Duchy of Lancaster Building, St. Paul's Cathedral, the Royal Hospital, Chelsea, Canada House, and South Africa House, would also be floodlighted. Still further, consideration was being given to the possibility of similarly lighting the Palace of Westminster in addition to the Clock Tower. He said that his Department was conducting experiments in Westminster Hall with a view to ascertaining the practicability of effectively floodlighting the oak roof.

On Tuesday, July 16th, when the King reviews the Fleet at Spithead, all ships will be floodlighted.

Electrical contractors will find special business interest in the Lord Chamberlain's announcement of functions, and in the Home Office programme of public events, which were published in the Press on Tuesday morning. The routes to be followed for the various Royal processions will naturally be thoroughfares where decorations and electrical illumination schemes will be more generally adopted. Contractors will also find it profitable to bear in mind the readiness of Royal Warrant holders to avail themselves of this special opportunity for demonstrating their loyalty.

The Home Secretary has issued a statement expressing the view that while local authorities will be the best judges of what is suitable, something in the nature of a fête, with street decorations and illuminations, might be included in the programmes.

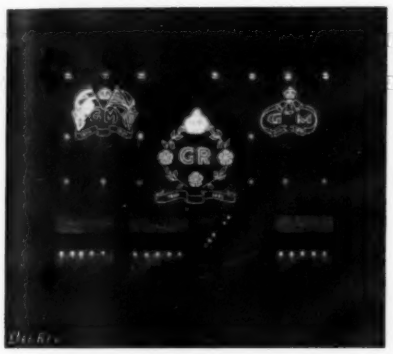
Equipment for the Celebrations

The electrical industry's preparations

It will be evident from the record of typical activities in the preceding article that a vast volume of illumination appliances and materials will be called for in all parts of the country. Although some manufacturers have been slow to make their preparations the following notes will prove that a large number of them have made a great effort to meet (and stimulate) the demand. In the course of our interviews with manufacturers it has been made abundantly clear that readiness to supply materials is not enough. The public needs to be acquainted with the abundance and variety which awaits its orders and to this contractors, suppliers, and all who wish to take advantage of this opportunity must give their full attention during the next few weeks.

IT is not generally advisable to stress the fact that last-minute work can be undertaken, and, as in all kinds of business, late demands for neon have the smaller chance of being satisfied, but for the Jubilee there will undoubtedly be many late demands, for enthusiasm will increase as May 6th is approached, and it should therefore be realised that neon can be made and installed quickly. Mr. Dereham, of Electrolumination, Ltd., informed us that there is no point in stocking made-up neon because it can all be done so quickly. A large display can be dealt with from order to "running up" in three weeks.

A little gloomily, perhaps, Mr. Galton, of Borough Electric Signs, Ltd., also referred to last-minute business. He said that people will want displays erected before permission to do so can be obtained; much Christmas business is annually lost in this way.



A neon display design (Electrolumination)

The Commercial Electric Co., Ltd., makes a special appeal for the placing of orders at the earliest possible moment as the result of careful calculation which shows that the British manufacturer of electric lamps is almost certain to be unable to cope with the rush of orders unless given reasonable time, if British lamps are to be used exclusively for this British Jubilee.

If Mr. Chapman's (Maple & Co., Ltd.,) picture of celebration archways at every nook and corner of every town in the country is a little optimistic, then we prefer it to the somewhat depressing note sounded in the foregoing. He said that shopkeepers, business houses, offices, hotels and restaurants along procession routes will have attractive displays, all with outstanding commercial appeal. An official of one of London's largest stores, by which a very large sum of money will be spent in Jubilee decorations, told us that a definite relationship must be shown between the cost of the illuminations and the business anticipated therefrom.

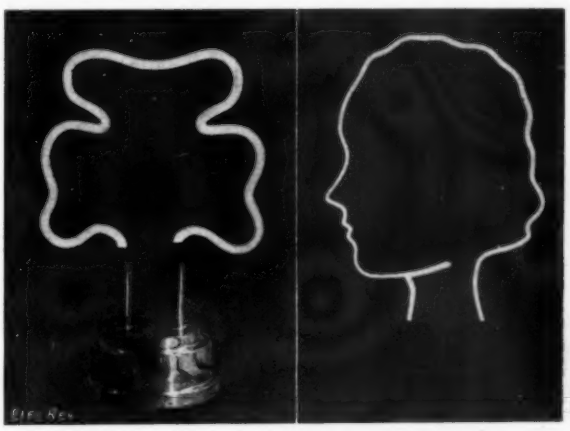
Probable Permanence

Properly designed illuminations can be considered as more than temporary. The Regent Street plan, to which we have already made reference, is an example. Then, again, there have been considered as floodlighting subjects many times. Let the Jubilee be the driving force to initiate these schemes.

Mr. W. J. Jones, of the Lighting Service Bureau, says that illuminations on the occasion of the King's Silver Jubilee will finally establish floodlighting in public favour, and will inevitably result in buildings of all kinds being permanently floodlighted. Messrs. Pearce Signs, Ltd., have the right idea in coupling Jubilee work with trade revival.

A G.E.C. self-contained adaptable neon unit

There will be more than the usual numbers of foreign visitors in the country. The Birmingham Section of the British Industry Fair coincides with the Jubilee period. And because all over the country there will be more people in town it will be an ideal time to brighten up the shops. Tubelight Sales, Ltd., say that an enormous amount of good will can be created by the celebrations, and we heartily agree.



Self-contained window units (Brilliant & Clolite)

We may mention some notable examples of the right outlook in connection with the celebrations. The appearance a few weeks ago of the attractive Jubilee catalogue issued by the General Electric Co., Ltd., was really encouraging. The Strand Electric Co., Ltd., tells us that it is working "all out" on orders from the trade, and is considering the possibility of a double working shift. The Brilliant Sign Co., Ltd., informs us of orders from India, and the Franco-British Electric Co., Ltd., says that encouraging inquiries have been received from stores, hotels, restaurants and factories.

Intricate neon work (Maple's)

A G.E.C. illuminated flower box

Wiring and Lamps

Our present notes do not pretend to refer specifically to other than actual lighting equipment, but the business will react favourably on all sections of the industry, and we are encouraged to believe that the makers of cables, transformers, switches and lampholders are not enough "Blackpool illuminations" at our seaside resorts. Many public and private buildings, parks and gardens, docks and factories, including electricity generating stations,

are alive to the possibilities which the Jubilee affords them.

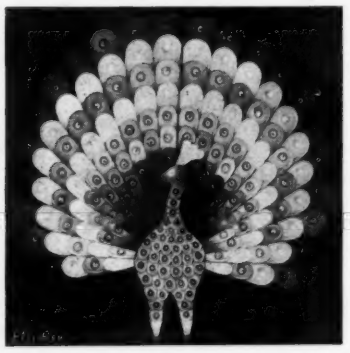
Mr. Ll. B. Atkinson, director of the Cable Makers' Association, tells us that C.M.A. members are putting on the market the following cables for temporary work at special prices: 7/0.029 insulated with paper and v.i.r., or with v.i.r. (250-V thickness), flat twin t.r.s. cable; and 7/0.029 insulated with paper and v.i.r., or with v.i.r. (250-V thickness), flat twin braided and compounded cable. These cables will be marked "Jubilee temporary lighting cable," and Mr. Atkinson says

An "Ediswan" floodlighted non-electric sign and a G.E.C. built-up neon display

that there should be no difficulty whatever in contractors obtaining sufficient quantities.

Mr. R. Bagnall, of the Foster Engineering Co., Ltd., tells us that his company is making preparations to meet any demand that is likely to arise for h.t. transformers for supplying neon signs, and that there is no likelihood of any work of this nature being held up through lack of such equipment.

M.K. Electric, Ltd., are taking every reasonable step to ensure that any increase in demand for their accessories will be met with promptitude.



An Imperial animated peacock

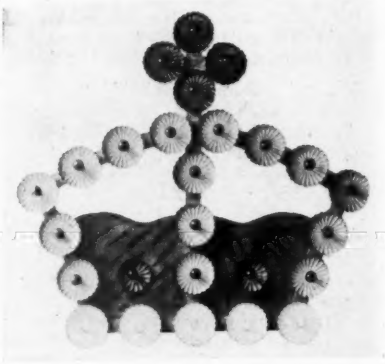
The message from Mr. Jones (E.L.M.A.) is that it is fully anticipated that the impetus given to architectural and coloured lighting will result in an increased use in every place where "joyful light" is required. "It is for this reason that I maintain that all sections of the electrical industry will benefit from the lighting in connection with the King's Silver Jubilee, and the wisest will follow up immediate results with plans for future development."

Messrs. Crompton Parkinson, Ltd., are already booking special orders for lamps and arrangements are being made to ensure rapid delivery of large supplies.

For convenience we regard Jubilee installations under two main headings—displays for built-up lighting and the decoration of large areas; and signs, meaning self-contained units completely constructed in the factory. But there must necessarily be a good deal of overlapping.

A simple unit in wood (Falk, Stadelmann)

As perhaps the most outstanding development of recent years in exterior decorative illumination, neon tubing must play an important part in the Jubilee work. Messrs. Pearce Signs claim that no design is too intricate for them to execute. They handle neon work with from 7 mm. tubes for small signs, up to 20 mm. tubes for outlining buildings. Given reasonable time, they say, there will be no difficulty in turning out any work. As makers of both neon and lamp displays this company emphasised that the lamp sign could not be introduced so successfully with lamps as with neon.



A Siemens crown with reflectored lamps

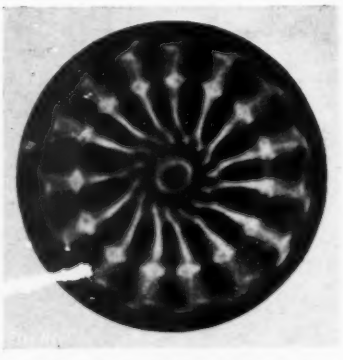
The one drawback to neon, said Mr. Probst, was its initial cost, which was explained by the impossibility to "mass-produce" it and the highly skilled labour required for its manufacture. But it was very economical to run, 7 W per foot being an average loading. A better effect can be obtained by gaseous tubes than by the old bulb sign at under a quarter of the expense, according to Mr. Newton, of Neon Rays, Ltd.

Messrs. Maple's stress the importance of hiring neon displays, particularly for short-term work, as a means of overcoming the initial cost difficulty, and they state that they are ready to undertake installations of any description on this

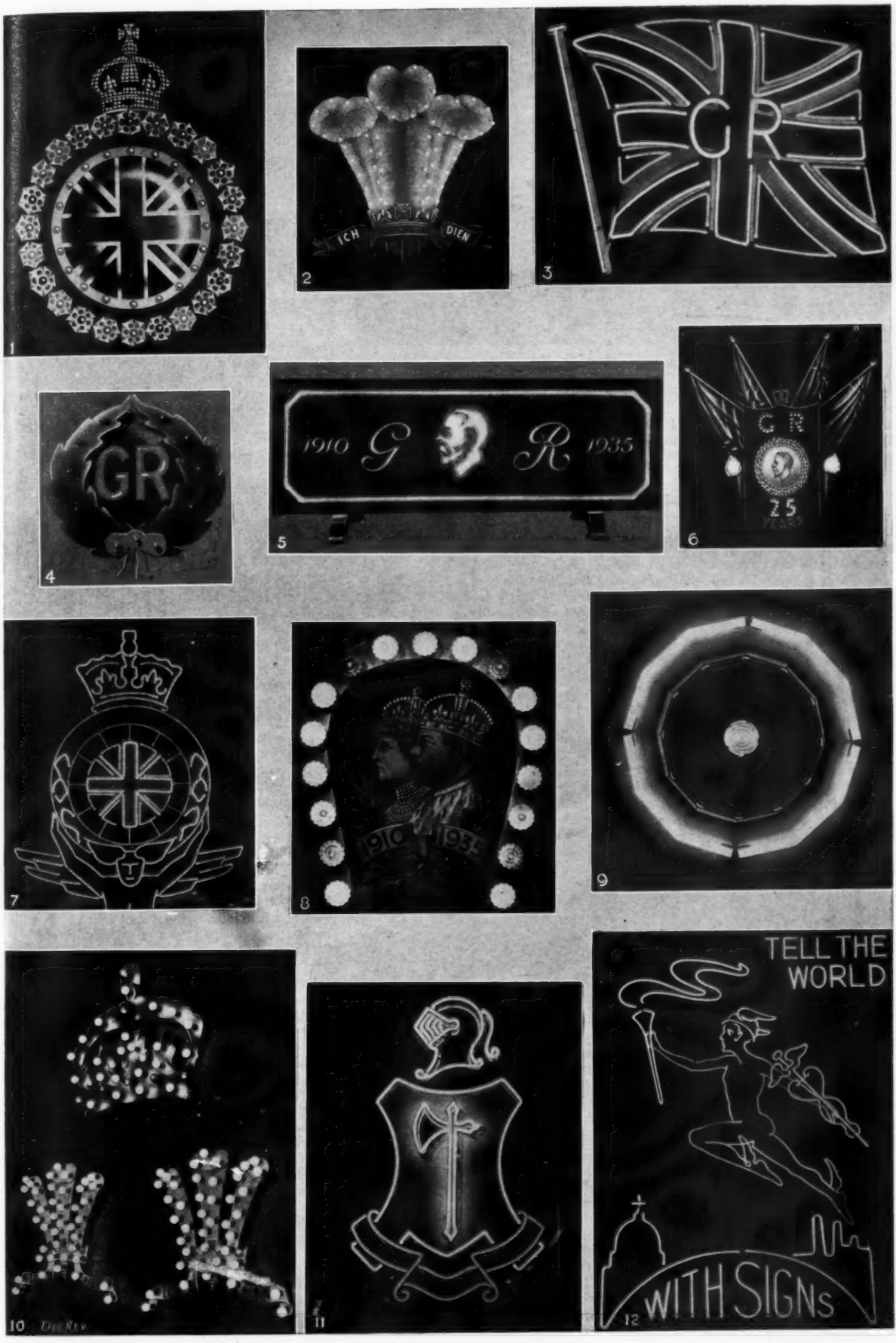
Pearce "Halo" letters in good use

system. Catering in that way must demand large-scale stocking, and they point out that they have a "library" with over 1,000 characters in sizes up to 3 ft., any of which are available for supply within twenty-four hours. Messrs. Austin Walters & Son, Ltd., are also proud of their stock of several hundreds of neon letters, which has been called on frequently for the rapid provision of exhibition installations. Mr. Bradbury mentioned the favourable position of London as compared with the provinces with regard to the "servicing" of neon installations.

Mr. Newton maintains that neon installations throughout the country should be controlled by the established contractors. The erection of a sign is a very simple matter, he says, and the local man in whose district it is installed offers the best and cheapest service which the consumer can obtain. The installation requires a certain amount of high-voltage skill. The tendency to-day is to keep the potential difference to earth as low as possible, consistent with costs, as the maintenance charges increase



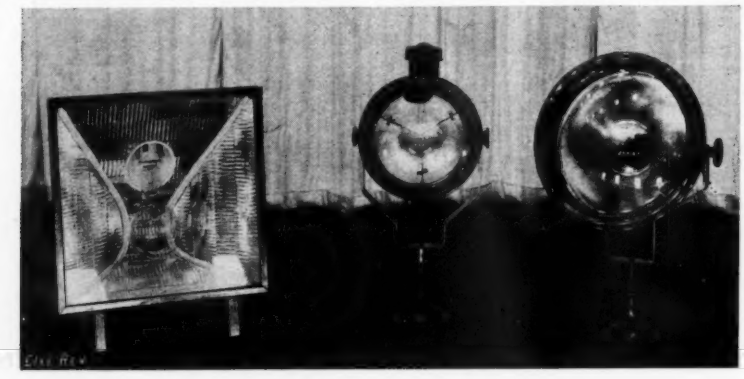
A Mek-Elek rotary neon sign



Selected and Suggested Jubilee Signs

1. The G.E.C. "Jubright." 2. Strand Prince of Wales's Feathers with 60 lamps. 3. Union Jack in nine neon sections (Electric Signs). 4. A Falk, Stadelmann wreath design. 5. A "Claudegen" window sign. 6. Siemens flag and flambeau panel. 7. R.A.C. badge (Neon Rays). 8. Imperial painted fabric panel box sign with reflectored surround. 9. Tubelight duodecagonal design. 10. Beeantee celebration devices. 11. A suggestion in neon (Franco-British). 12. A Jubilee slogan (Electro-lumination)

considerably with the higher voltages. All terminal contacts should be protected from moisture and water, and the h.v. cables must, of course, be adequately insulated and ozone-



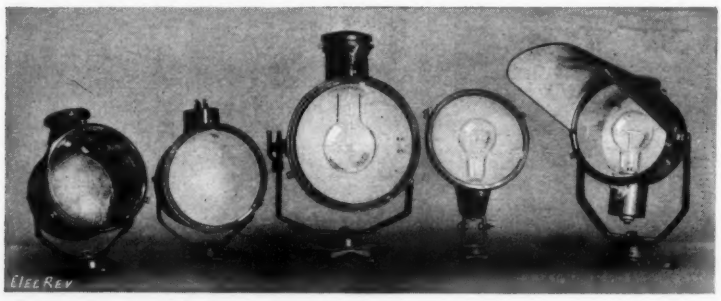
Strand standardised projectors for hiring

proofed. The Electrolumination method of preparing designs for display work is interesting. From a sketchy word picture expressed by the prospective customer a drawing is made, and this is then traced on to black art board. With the colours applied by an air brush effective and attractive pictures are produced.

Variation of Colour

Examples of the overlapping between sign and display are the Maple characters, each of which is mounted on teak as a self-contained unit, and the Claudegen units for exterior display with which hundreds of designs can be created, each individual user making his scheme elaborate or simple to his own satisfaction. Erection is simple, and the units are ready for normal connection to any a.c. supply. Neon seems to be the established name for all the gaseous tube work, but many colours other than the original red (neon) are now obtainable by the use of other gases, and Electrolumination hope that the Jubilee will be the opportunity to introduce new colours.

Neon Rays point to some particularly attractive colours. The green from a mercury vapour in a uranium yellow tube, for instance, and also the pinky white from helium ionisation. Messrs. Pearce Signs informed us that by the inclusion of certain crystalline salts in the glass walls it has been possible to harness the ultra-violet radiation of an ordinary discharge tube, so allowing greater intensity and a wider range of colours for the same consumption. Apart from animation from ex-



Kandem projectors: Left to right, narrow beam, wide angle, wide beam, hoarding unit, special shield for level crossings

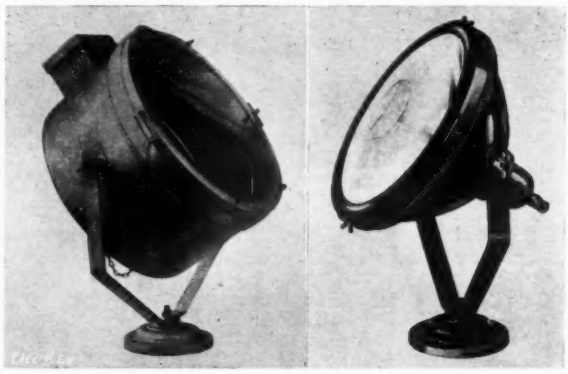
ternal control, neon can also be given a rippling effect by the inclusion of an impurity in the gas.

Benjamin Electric, Ltd., point out that floodlighting is now economical and practical, while the G.E.C. says that it simultaneously expresses the occasion and reveals architectural and sculptural features. These alone are good reasons for prominence of floodlighting at the coming celebrations.

The latter company has produced special projectors for short service which will give generally the same results as standard equipment, but are constructed with reflectors and housings which are not so permanent in use. One of these models for general utility building illumination will take a 500-W or 1,000-W lamp and will give medium- or narrow-beam distribution. The body and reflector are in one piece and of a non-tarnishable metal. A projector produced by the Revo Electric Co., Ltd., is claimed to be very useful for temporary installations, on account of its easy handling and transportation. The reflector is of chromium-plated heavy-gauge copper, with a series of ribs designed to intensify the light. A steel chimney, housing the lampholder and an easily operated focusing device, is capped with a cast-iron dome fitted for ventilation.

We heard a few murmurs regarding the necessity for hiring out and lending projectors, but the Strand Electric Co. considers that these obligations must be undertaken by somebody and thinks that they will be profitable. In the view of this company, the bulk of the illumination business will be hiring, and for this the company has a standardised hiring scheme. Two 1,000-W projectors are hired out at 8s. 6d. per week, and a 500-W round equipment with a 108-deg. beam angle at 6s. 6d. per week. The 1,000-W round model has a 22-deg. beam and the 1,000-W square unit is suitable for ground location at 15 ft. distance and with 30-ft. spread.

There will undoubtedly be many new problems for contractors and others to solve at short notice, and a good point made by Briton Lamps, Ltd., is the provision for trial and error experiments. The new "Junior Jubilee" projector is designed for this. It has a sliding rod and clamp focusing gear, by which any lamp from 150 to 300 W can be used. Adjustable focusing is also a feature of two projectors introduced by Beeantee Illuminations, Ltd., while the types "E L" and "E S" projectors supplied by Siemens Electric Lamps & Supplies, Ltd., have a suitable extension piece which enables a lower wattage lamp to be used if desired.



A Siemens floodlight and a Holophane "spotting" projector

In one of the Briton models a special point is made of the highly intensive silvered reflector by which it is claimed the normal reckoning of 2 W per sq. ft. at 20 ft. can be reduced by 25 per cent. The reflector is also specially featured in the descriptive matter relating to projectors produced by Floodlighting & Fittings, Ltd. By an electrolytic process a matt silver reflecting surface is deposited on the main body, resulting in a perfect white light without spot effects. It will resist the corrosive action of salt water, etc.

Electric Discharge Lamps

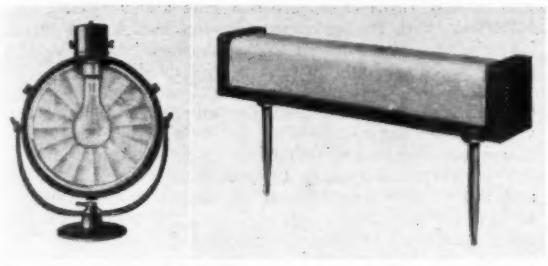
Discharge lamps are new high-efficiency units for the lighting engineer, and Philips Lamps, Ltd., draw attention to their two main types, sodium and mercury; 50 W and 150 W are the smallest and largest sizes of the sodium model and 2,300 lumens is the output for a gross loading of 65 W for the former, and 9,000 lumens and 170 W gross are the equivalent figures for the largest model. The amber light is very suitable for flooding, while the familiar blue-green of the "Philora" mercury lamps affords a convenient colour contrast. The Siemens "Sieray" type "W" discharge lamp is designed to give an improved colour effect over the ordinary h.p. mercury discharge lamps, and it emits an appreciable amount of light at the red end of the spectrum, so that colour rendering approaches much more nearly to normal daylight.

The "Mercra F" projector produced by the British Thomson-Houston Co., Ltd., is described as ideal for all floodlighting schemes, and is constructed of two gunmetal end

"Jubilee Junior" projector (Briton Lamps)

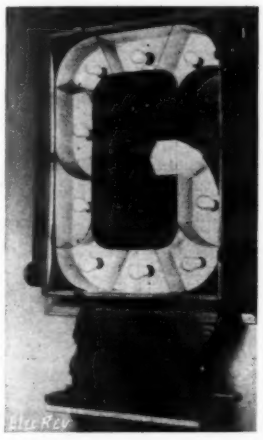
castings with a heavy-gauge copper back and bottom. It has been specially designed for use with "Mercra" lamps, and an exclusive feature is the magnetic control device which permits the horizontal burning of h.p. mercury vapour lamps.

The Strand Electric Co. considers that floodlighting will not



A temporary service projector and lighting unit for flower beds (G.E.C.)

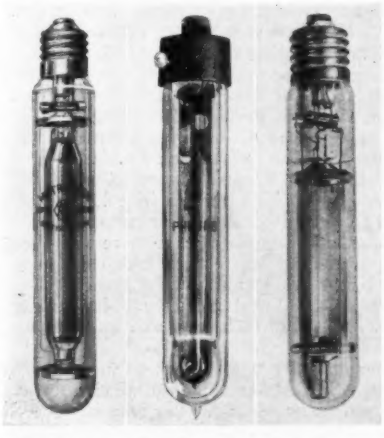
show up to the best advantage in London because the dirty buildings will not permit of colour-flooding. The company specialises in such colour work, and all the standardised hiring models referred to, as well as others, can be fitted with colour screens behind the glass domes. Lower consumption of current is stressed by the G.E.C. in connection with "Osira" colour floodlighting by virtue of the absence of light-absorbing colour media. A range of colours includes red, two blues, two greens, and a yellow. The Metropolitan-Vickers Eelctrical Co., Ltd., says that its 250-W and 400-W a.c. discharge lamps are particularly suitable for spectacular floodlighting effects. Floodlighting schemes can be prepared at short notice with lanterns for vertical or horizontal burning.



"Monogram" speller (Electric Sign Co.)

Long-range floodlighting is a special problem, particularly for public buildings, and many readers will readily recall the wonderful effect of Big Ben and Westminster Abbey floodlighted during the International Illumination Conference. Holophane, Ltd., state that their F.L. 1,000 pre-set long-range projector was used on this work.

Considerable sums of money are being spent on special shows in public and private parks and gardens, and it is for electrical people to show how that money can be spent to the best advantage. Floodlighting gardens is a success well past the experimental stage. Holophane recommend their "Multiflood" trough with two, three or four sections and with facilities for colour flooding for such work. They also draw attention to a series of watertight floods which are suitable for clear or colour illumination of fountains, pools and waterfalls. Flooding from above seems to be particularly suitable for application to gardens, swimming pools and sports arenas, and in this connection the Benjamin "Duoflux" can be used. This projector is suitable for use with 300- to 1,500-W gasfilled lamps, or with 250- and 400-W discharge lamps. It can be supplied for either pole-top or pole-clamp mounting.



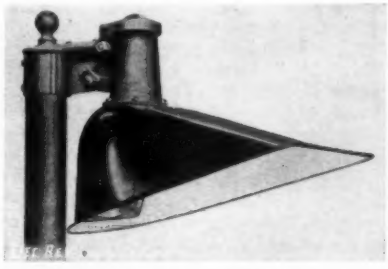
Discharge lamps: The "Metrovick" and Philips sodium and mercury lamps

The "Waltham" projector produced by the Edison Swan Electric Co., Ltd., is another downward lighting unit. It gives a wide asymmetric light distribution, with the maximum c.p. at 50 to 60 deg. from the vertical. The front lens concentrates the light into the beam for long-distance throws, and it is available for pole-top, pole-clamp and wall fixing.

The No. 2 E.M. model is one of two new projectors to be introduced in time for the celebrations by the Kandem Electrical Co., Ltd., and it is described as suitable for small open spaces. It will take 300- to 750-W lamps and has a 60- to 70-deg. beam angle, and a half-pole clamp base. A narrow-beam projector of the same make is specially designed for service at level crossings and a long top reflector shield prevents glare. This should be useful in many garden schemes. There is a range of watertight reflectors of the same make suitable for gardens. They have the usual porcelain canopy with a built-in lampholder providing protection to the screw-in globe, which is made watertight by the use of a rubber gasket. The reflector slips on. When supplied with a coloured globe, making a totally enclosed unit, they are suitable for fountain illumination. Electrical people will be slow if some Jubilee ideas are not conceived from the excellent examples of hoarding floodlighting to be seen nowadays. The other of the two new Kandem wide-beam units takes a 200-W lamp, has a 60- to 70-deg. beam angle, and is suitable for use at 8 to 10 ft.

The Revo "temporary service" projector

We have received from Floodlighting and Fittings some attractive pictures of posters well-flooded by projectors with a 160-deg. beam operating at a distance within 4 ft. The flat, wide beam renders the upward-projection Kandem "Specular" suitable for poster work.



Benjamin downward projecting "Duoflux"

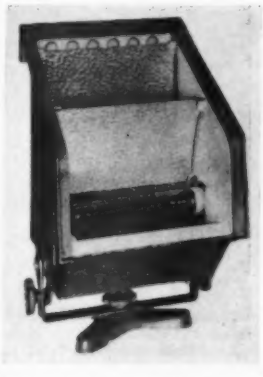
The lighting of non-electrical signs generally demands narrow beams at short distances. For 4- to 7-ft. projection the 100- to 200-W Kandem fitting is the smallest of three sizes. The low-wattage "C.P.S." Siemens floodlight is suggested as suitable for this work, and we learn that Messrs. Falk, Stadelmann & Co., Ltd., are putting up some small projectors specially for non-electric signs.

In spite of the advance of neon there will be plenty of room for all kinds of celebration lamp work, with a marked influence on the lamp industry.

Messrs. Crompton Parkinson, Ltd., are introducing a new range of "Kye" spray coloured lamps specially for the Jubilee. Pigmy and ordinary sign lamps are marketed by Pope's Electric Lamp Co., Ltd., in seven colours for strip and festoon work. All the sign lamps are of the vacuum type because of their cooler running. Briton Lamps, Ltd., state that they are building up very large stocks in preparation for the business. A good example of the modern animated neon lamp is the Siemens "Dobrulox," which is so constructed that the glow is always moving around the internal cone.

Doubts have been expressed as to the possibility of meeting very large spraying orders, and Commercial Electric consider that there is not sufficient spraying equipment in this country to meet the demand, even if orders are placed immediately.

Mr. Wran (Pope's) expressed the opinion that there should be no difficulty in spraying; it was an easy matter for a girl



The B.T.H. "Mercra F" projector

to work along a line of lamps with a " gun " in a few minutes. Briton Lamps are making arrangements to have lamps colour-sprayed in bulk, and they claim that they will be in a position to deal with orders for large quantities in twenty-four hours. The coating of the Siemens coloured lamps is said not to discolour under normal working conditions, and to be uniformly and firmly applied by a special spraying process.

Among the special lamps for which there is good promise the Boula reflector lamp produced by the Boula Reflector Lamp Co., Ltd., is one for which is claimed almost the double output for the same consumption compared with an ordinary lamp. A skin-like silver mirror reflector is attached to the glass of the lamp itself, thus focusing the light where it is required. We are indebted to Commercial Electric for some useful installation hints concerning colour lamps: blue is unsatisfactory, as the lamp gets hotter and the illumination is lower; watertight holders should be used outside; special lamps should be ordered for inverted burning; the spray should be reasonably weatherproof; an attractive shape of bulb is necessary for festooning; there is no need to exceed 15 W; sprayed traction lamps are very satisfactory; sprayed lamps give more definite colour rays than natural-coloured bulbs; natural colour is hard to match; the filament shows through natural colour; sprayed lamps remain cooler; lamp lacquer that will not chip, crack, or peel off is unknown to them.

A Floodlighting and Fittings unit with two-way focusing

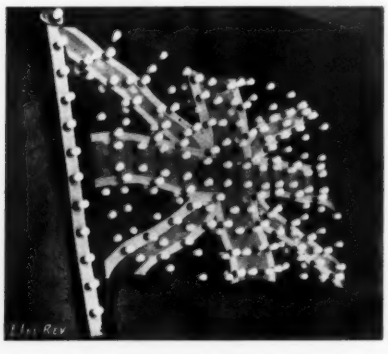
Mr. R. W. Willis, of the Sun Electrical Co., Ltd., pointed out how simple it was to cater for festooning with the modern insulation-piercing contact lampholders. The company's customers simply ordered coils of twin flat c.t.s. cable to the required total length and gross boxes of " Beeantec " holders. The Beeantee Co. caters for interchangeable strip lighting in assorted colours for outlining buildings, piers, promenades, and bandstands. The " Multilite " holders made by the same company are suitable for all types of multiple lighting.

The wiring of all such lighting schemes is simplified and can be altered by reversing the holders on the cable. A red spot on the holder facilitates placing it on the cable in an intermediate manner, according to the scheme required.

Mr. Lambert, of the Imperial Lighting Co., Ltd., interested us in the very practical manner in which large quantities of " Fairyland " strip are dealt with at Blackpool. At the end of the season the lengths of strip are permanently jointed and rolled up on drums in continuous drum lengths. At the beginning of the next season runs are cut off as required, as would be the case with new cable. In the company's workshops we saw attractive coloured lanterns with streamers specially made of weatherproof material for outdoor festooning. The G.E.C. is meeting the demand for floral festoons.

An outstanding example of a large animated lamp display may be seen in Leicester Square. It was installed by the Franco-British Electrical Co., Ltd. It measures 1,050 sq. ft. in area, takes nearly a minute for its performance, and embraces 3,000 " Ediswan " gas-filled lamps and 400 ft. of neon tube. In another lamp display by the same company for Bertram Mills's circus a clown dances and juggles with bottles and the name flashes on and off with the juggling.

In architectural lighting the l.t. filament tubular lamp will play an important part. Mr. Stewart, of Tubelight Sales, Ltd., said that some hundreds of feet are already installed on the exterior of Prince's Restaurant. Outdoor use is possible because of the low surface temperature, 115 deg. F., and by virtue of compound filling the holders after wiring. Comparing it with neon, he stressed the fact that the tube lamp gave illumination as well as decoration, and he claimed that for actual outlining it could effect a saving over all other methods, except neon.



A simple lamp-studded flag (Beeantee)

Because of the wide scope of tubular lamp work it was impossible to standardise, but seven standard colours were available, and in every case natural-colour glass was sandwiched between two clear glass skins. On the ceiling in the Tubelight showroom we saw what could easily be an excellent wall display, with tube-lamp outlining and a central design.

Curved tubes for festooning was an idea shown to us by Maple's, who also referred to " sunbathed " walls, wonderful effects in foliage, and attractive window displays.

Because the usefulness of self-contained signs constructed specially for the celebrations lies wholly in their decorative value, their story can best be told by pictures. Several companies are offering comprehensive ranges of such characters as crowns, Prince of Wales's feathers, flags and all sorts of floral and other decorative designs in various constructions. The units in the very large range of G.E.C. " illumination devices " are of reinforced papier-mâché and metal construction, and are largely weatherproof and fire resisting, and are completely wired and ready for use with standard or sign lamps.

Plywood is another convenient constructional material, excellent examples of which we saw in the showrooms of Messrs. Falk, Stadelmann & Co. Single letters in wood, similar characters in metal trough lead-coated steel units, and combined wood and metal signs are all included in this attractive display. Painted sheet-metal studded with small sign lamps is the construction of some units we saw in the Strand Electric showroom. A Prince of Wales's feathers unit 4 ft. 6 in. high carries sixty lamps.

Imperial Lighting are making a speciality of the cellular construction for metal units, particularly those of the animated type, on the score of good definition. A peacock has 200 sections, and the well-separated colours are prevented from spreading, especially when the outer lights are off. Of similar construction is the " Kaleidoscope," but the main point about this, perhaps, is its thermal control which provides for the constant changing of colours without definite sequence.

Other Novel Devices

Wonderful effects are obtained by moving colours blending together in the revolving neon signs produced by Mek-Elek Engineering, Ltd. Slight alterations in the shape of the interchangeable neon tubes enables a wide variety of patterns to be produced.

The Electric Sign Co. has some useful message transmission signs. In addition to a wide range of still signs, Beeantee Illuminations produce a number of animated units.

Floral reflectors are a feature of some of the Siemens units, and wood with fabric coverings is another Siemens scheme, and a particularly interesting development of the simple box sign is the King's head on fabric illuminated from behind. The company also has a range of self-contained units painted in natural colours with neon super-imposed, as well as strongly constructed letters and other characters wired, with lampholders.

Reflectors are used by the Imperial Lighting Co. to give some realistic representations of flowers, and a bunch of bluebells is made with some of the old-type glass bell shades. Borough Electric Signs and Electrolumination recommend the wood-letter sign for quick celebration business. With neon characters hung on the letters and the whole mounted on a simple angle-iron framework there is a cheap and convenient sign.

The Pearce " Halo " sign, with its metal trough letters containing lamps and inverted against a matt and diffusing background affords a welcome relief in many cases. The Neon Ray R.A.C. badge and the Union Jack produced by the Electric Sign Co. are excellent examples of neon work, while there is a sound idea behind the self-contained shop-window units produced by the Glowlight Transformer Co., Ltd., and the Brilliant Sign Co., Ltd. The glass sign proper can be changed, and it simply plugs into the base.

Apart from the special Jubilee units in lamps or neon offered by the Franco-British Co., the company has a new idea in which neon tube is mounted at the back of a glass panel of a box sign carrying a sand-blasted design. The tube is invisible by day. The British Electrical Installation Co. is preparing expensive moulds of the heads of the King and Queen which will produce embossed translucent models in colour capable of being illuminated from behind. A tubular lamp sign in the Tubelight Sales show-room is a duodecagonal figure outlined by four lamp sections, each with three sides. A central opal rose is lighted from behind and surrounded by glass rods.

An Imperial Lighting Co. self-contained cascade has six tiers, a bank of coloured lamps under each tray, and its own pump and rotary switch.

There should be no difficulty with regard to the supply of control equipment for animated signs; indeed, all sign makers, we believe, cater for all requirements in this respect. Batwin Electrical Appliances, Ltd., have drawn our attention to their flasher control units, and Alliance Wholesale, Ltd., have sent us particulars of their scintillator.

The British Industries Fair

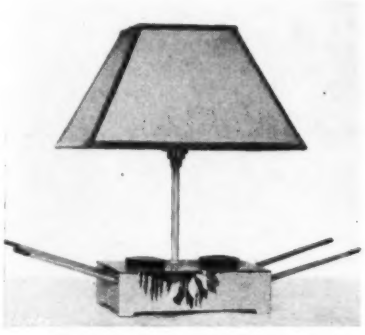
Electrical exhibits at Olympia

The representative display of British goods in the London Sections of the Fair will be on view from February 18th to March 1st inclusive. The exhibits at Olympia include plastic mouldings, scientific instruments, radio equipment, lighting fittings, glassware, clocks and vacuum cleaners, as detailed below. Textile fabrics and furniture are at the White City, while engineering and heavier products will be exhibited at Birmingham in May

Aladdin Industries, Ltd.

This display is on a large scale, consisting of a variety of pottery lamps and an extensive selection of decorated wooden lamps at all prices. The shades on view range from 7in. up to 24in. floor standard models made in all materials, with "Whip-o-lite" (manufactured under the company's own patents) predominating.

A recent introduction is the "Deskalite" (illustrated) inkstand and lamp in one, complete with pen-holders, inkwells, &c. The inkstand is of pottery



The Aladdin "Deskalite" with inkstand

and the shade of "Whip-o-lite." It will be available in a wide range of colours and designs, plain and decorated.

Beetle Products Co., Ltd.

This company will display samples of aminoplastic industrial moulding powders together with examples of mouldings made therefrom. "Beetle" powders are available in a large range of colours, including white, translucent and pastel shades. "Pollopas" powders are offered in a somewhat similar range.

"Scarab" is a relatively new urea powder comparable in price to phenolic products. It is obtainable in black, brown and bright opaque colours which are claimed to be fadeless. This material is expected to have many electrical applications, since it is said to resist the arc tracking tendency.

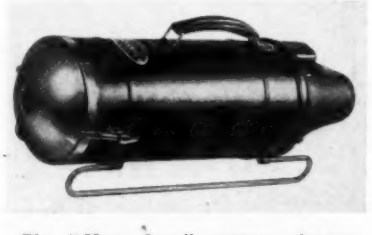
Belling & Lee, Ltd.

An interesting electro-mechanical display of numerous noise-making appliances automatically switched on and off, demonstrates the resulting interference picked up on broadcast programmes to be heard or seen on a cathode-ray tube. Pure music and that which has been interfered with alternate as one removes and replaces a suppressor in circuit with the offending vacuum cleaner, neon sign, or electric motor.

A varied selection of different types of condenser and choke suppressors is available at reasonable prices, in addition to insulated indicating terminals, plugs and sockets, fuses and accessories.

British Electric Domestic Appliances, Ltd.

The "Mary Ann" electric vacuum cleaner (illustrated) of the cylindrical



The "Mary Ann" vacuum cleaner

type with enclosed dust bag is fitted with two coupled turbo-active fans and a motor operating on both a.c. and d.c., running in ball bearings, which require no lubrication, and mounted on rubber. The body is of steel covered with Rexine, and the motor is encased in bakelite, rendering the machine shock-proof.

A range of eleven accessories for every cleaning purpose includes disinfecting pads for deodorising the air. The machine is of sturdy construction and simple in operation, and it carries a comprehensive guarantee for twelve months.

The "Bedal" electric iron is 5lb. in weight, fitted with thumb rest and back rest and complete with connector, flex and adaptor.

British Vacuum Cleaner & Engineering Co., Ltd.

Vacuum cleaners of the "Goblin" domestic type range from the "Ideal" lightweight, with an external dust bag and agitator in the nozzle, to the cylindrical runner models, such as the "Clean Sweep," with an insulated motor running in ball bearings; the "Triumph" has a 125-W motor, a carpet nozzle agitator, and air sanitising device, while the "De Luxe" model is packed in a strong storage box with extra nozzles.

The "B.V.C." range is an industrial pattern suitable for cinemas, hotels, factories, and other large buildings.

British Xylonite Co., Ltd.

This company manufactures celluloid, including a safety variety known as "Bexoid," as well as "Lactoid" artificial horn in sheets, rods, and tubes, and "Bex" moulding powders and mouldings in synthetic resins for all trades.

J. A. Brook, Ltd.

The "J.A.B." electric lamp lock is said to be the only one that can be used in a Home Office type skirted lampholder. The "Complete" pattern is adaptable to the ordinary lampholder, and locks not only the lamp but also the holder and all designs of single shade. A special insulated spanner is provided.

There are also lampholders with lock attached, while the "Klip-Lamplok" is designed for bakelite holders, finger pressure only being required to lock the lamp so that it cannot be stolen or otherwise interfered with.

Bylock Electric, Ltd.

A feature of this company's domestic suction cleaners is the really large air flow they are capable of inducing. They are of the cylindrical runner pattern with an internal dust bag. They are made in London and are provided with a full set of accessories, a leatherette covered packing case being also available.

Turbine-type fans are used, and a special effort is made to render the ball-bearing motor silent running. The latest "Star" series of cleaners and hair dryers is bakelite covered.

Cable and Wireless, Ltd.

This group shows submarine telegraph apparatus consisting of a complete transmitting and receiving circuit and the newest type of speed-control mechanism used in conjunction with both sending and receiving mechanism. The usual half-inch paper tape is shown being perforated by a manually operated keyboard perforator, the tape passing through a transmitter (which sends code signals to the cable) driven by a phonic motor, the electrical impulses for which are supplied by a vibrating reed controlled for rate of vibration by a pendulum clock.

The receiver magnifier has a suspended coil, attached to which is a light aluminium plate moving adjacent to two fixed plates connected to the grids of two valves. A super-audio frequency voltage acting across the capacity between these plates causes the valves to provide a magnified reproduction of the input signal currents in the suspended coil. The output currents of the magnifier pass to the suspended coil of a delicate relay which carries light gold contact wires co-acting with silver butts; these in turn control relays of the Post Office type.

This device affords means of correcting the effects of varying earth currents. The distortion of the signals due to earth currents causes a slow movement of the silver butts to be made by a magnetic clutch so as to follow up the wander of the gold wires due to earth currents. After passing through a further relay the signals operate regenerator apparatus.

Cinescope Publicity Co., Ltd.

The "It-Lum" sign is combined with a display stand for shop windows. It has an ebonised finish with silver enrichments and a border illuminated in colour. Provision is made for four changing advertisements to appear consecutively on the front panel, while the extending shelves at the top and sides are collapsible at will.

The "Cinescope" advertising apparatus is intended for use at night. It enables fifty different announcements to be projected consecutively on to a wall or screen. Each appears for ten seconds and may be of any size up to 9 ft. by 9 ft.

E. K. Cole, Ltd.

These radio manufacturers are exhibiting mouldings which have been pressed in the firm's own bakelite plant at Southend-on-Sea, the products of which vary from small control knobs to table tops and moulded radio cabinets (illus.). The bright shades of red, green, blue, and brilliant mosaics illustrate how mouldings, apart from their practical utility, possess definite value as decorative media.

Not only standard finishes of walnut and black, but also pleasing pastel shades of pearl-ivory and onyx-green,

An "Ekco" moulding

attract attention, while some of these cabinets have chromium-plated inserts, indicating that the blending of metal with plastics presents no difficulty and opens up industrial possibilities.

Thomas De La Rue & Co., Ltd.

The advantages of synthetic resins as an aid to the electrical industry are exemplified by this large range of shock-proof electrical equipment, in addition to samples made of what are claimed to be non-tracking and arc-proof materials. The exhibit covers the whole range of low-voltage electrical gear, from overhead line to house-metering and lighting. Articles of a decorative nature, such as lampshades and table lamps, will also be on view.

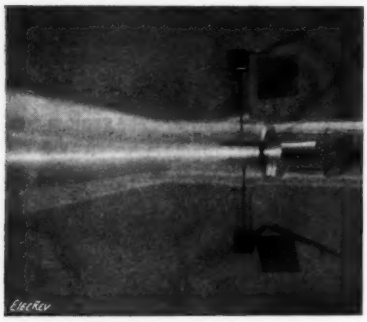
A comprehensive exhibit of "Telenduron" line insulators, terminal blocks, joint boxes, &c., demonstrate the latest practice in this field of overhead line transmission engineering.

Ebonestos Insulators, Ltd.

These moulders to the trade have a comprehensive display of synthetic plastic materials, among which are included numerous examples of moulded articles which have been manufactured for the electrical and allied trades.

G.B. Equipments, Ltd.

A complete range of the new 16-mm. sound-on-film equipment, together with the latest accessories, will be used for practical demonstrations of commercial and instructional films throughout each day. Of interest are a series of giant photographs illustrating scenes from the latest G.B. commercial films used by some of the leading firms in the country, and



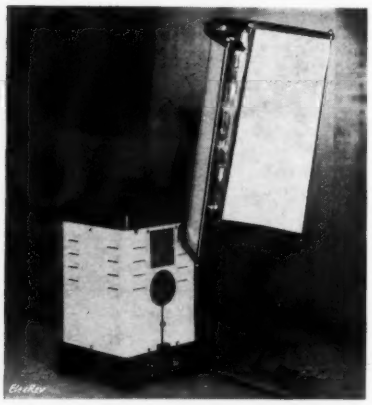
A cathode-ray tube (from a G.B. instructional film)

also the comprehensive 16-mm. entertainment film library list.

Hanovia, Ltd.

To a range of "Homesun" indoor sunbathing lamps a new model of the discharge type (illus.), which is self-starting, has been added. It is quite different from its predecessors. For both a.c. or d.c. operation a simple straight quartz tube is used, containing a solid electrode at each end and a trace of mercury. It does not require tilting; a touch of the starting button starts the discharge, of a reddish colour at first, due to a trace of rare gas introduced for easier starting, but quickly assuming the characteristic bluish-white mercury vapour tint.

For a.c. the outfit now consists of one



The Hanovia "Homesun" lamp

unit; the auto-transformer formerly needed has disappeared, as the circuit control consists of a reactance assembly. This makes the lamp more compact, its total weight being 20 lb.

The all-metal construction has been largely replaced by bakelite parts, and an earthing cable is provided. The starting button, fitted just below the switch, sends a momentary high-voltage surge through one electrode, so initiating the discharge.

This new lamp is produced under several British patents, of which Hanovia, Ltd., has acquired the sole British Empire rights for the manufacture of ultra-violet lamps.

Insulators, Ltd.

These manufacturers of synthetic plastic mouldings in a variety of shapes, sizes, and colours for the electrical, radio, and other trades utilise bakelite, phenol, and urea materials. Efforts are made to co-operate with customers in designing and manufacturing specialised articles for their particular industries and requirements.

Johnson Matthey & Co., Ltd.

Among selected products from a wide range, special emphasis is being given to fine wire drawing, of which there will be a practical demonstration; and silver, of which a special display is being staged. In addition to the various precious metal products in the forms prepared for, and supplied to, the decorative trades, such exhibits as silver solders, platinum, silver and precious metal alloy contacts will interest the electrical trade.

There is also a representative display of the wide range of precision repetition work, mainly in brass, which is produced by the Shepherd's Bush factory of this company. Part of the display is devoted to the various forms of precious metal plating at present in use, ranging from the comparatively recent rhodium plating to gilding and silver-plating processes.

Kent Mouldings

A representative selection is exhibited of plastic mouldings for domestic, medical, industrial and a variety of other purposes. Included in the display are attractive tableware, commercial products, advertising novelties, toys and mechanical, radio, and electrical accessories and parts. Mouldings in various plastic materials, in colours, mottled or plain, opaque or translucent, and in natural finishes representing woods, marble, tortoiseshell, &c., contribute to an attractive and interesting exhibit.

Kent Mouldings (proprietors: Kolster-Brandes, Ltd.) undertake the complete design and production of any types of plastic mouldings to customers' requirements, and also specialise in the moulding of complicated mechanical and electrical parts.

Lorival Manufacturing Co. (1921), Ltd.

This company's mouldings in various grades are adaptable to a wide range of electrical and other requirements. Improvements offered in Grade A in rod and sheet forms include increased insulating properties, higher mechanical strength, and improved machining facilities. This material can be cut, threaded, and otherwise worked upon more easily and with better results than formerly. It is cast moulded from a liquid phenol-formaldehyde base in black or natural (light yellow) colours.

This composition is hard, tough, and homogeneous, non-hygroscopic and resistant to all climatic conditions, acids and oils. It withstands a working temperature of 100 deg. to 120 deg. C., and does not deteriorate with age.

Grade B products are press-moulded from a powder base and are supplied in black as a standard finish. The material is fireproof. It is therefore very serviceable for arc-resisting purposes, switchgear, lift insulators, and other electrical uses where high temperatures are encountered.

Grade C mouldings are either of the synthetic resin phenol-formaldehyde or urea-formaldehyde types; they are extremely hard, and can be produced plain or mottled, with matt, highly polished, or other surface effects, and colour variations are unlimited. They are non-hygroscopic, and are unaffected by oils and by temperatures up to 150 deg. C. They do not deteriorate with age, nor from the effects of sun, frost or rain.

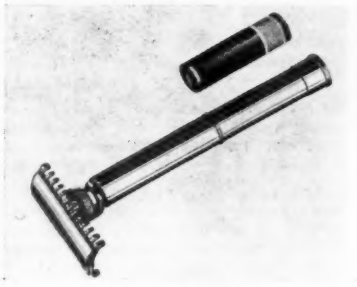
Mouldrite, Ltd.

A new I.C.I. transparent synthetic resin known as "Leukon" is shown in a granular thermo-plastic moulding powder form. It should be useful for making small electrical bobbins, coil formers and other small parts which need to have high dielectric qualities. This material is capable of treatment by either compression or injection moulding under the influence of temperatures around 140 deg. C. and at high pressures. It renders possible the mass production of complete articles with economy of time and effort by the elimination of intermediary machining operations.

The density of the material itself is about 1.2 at 20 deg. C., *i.e.*, about one half the weight of window glass, pottery, marble, or aluminium, 10 per cent. less than ordinary phenol-formaldehyde bakelite types of moulding powders, and 20 per cent. less than the amino types, &c.

Norma Technical Products, Ltd.

The "Telerazor" (illus.), shown by this company, is claimed to be the only British-made electric safety razor and the only one available which is entirely self-contained—that is, without any external battery or other source of supply. The blade is actuated by high-frequency impulse vibrations. It is operated by a specially designed double-impulse elec-



The "Telerazor"

tro-magnetic oscillator which moves with a rapid "reaping" stroke. The imperceptibly fine and very rapid motion, combined with the minute amplitude of the vibrations, produces an easy "gliding" cut, even when shaving "against the grain."

The mechanism and the tiny 1½-V dry battery are enclosed within the handle, which is completely water-tight. The battery can be replaced within a few seconds, and its average life is said to be more than a month. Special blades are supplied by the makers, but any good-quality double-edge blade can be used.

Francis Shaw & Co., Ltd.

This company manufactures machinery for making and moulding rubber, synthetic resins, cellulose acetate, and similar materials, as well as hydraulic equipment.

Smith's English Clocks, Ltd.

In this array of electric clocks, striking and chiming, is a full range of fancy chrome strut types, lever timepieces, travelling clocks, lever and electric alarms, bracket models, marine clocks, battery-driven types, etc.

A special feature is being made of illuminated alarm clocks and of the "Synfinity" or "Synspring" model, which has a lever escapement and is automatically kept regulated by a synchronous motor incorporated in the mechanism. Not only does this keep the clock wound up, but also corrects it to accurate synchronous time every 57.6 minutes.

An unusual model, which is also operated by a synchronous electric movement to ensure correct time indication, consists of two pieces of plain glass joined by a small cylinder that actuates the hands, but not large enough to incorporate the actual mechanism, thereby giving it an air of mystery.

Thermega, Ltd.

One of the newer patterns of electrically heated blankets made by this company is a felt-backed variety for medical use in dealing with street accidents and all cases of shock, as its use will keep a bed continually warm and ready for the immediate reception of a patient.

Another item is an electric foot mat (illus.) for use on the floor underneath

The "Thermega" electrically heated floor mat

a desk or table in an office or at bridge parties and for preventing floor draughts.

Tintometer, Ltd.

A feature is being made of colorimeters for determining the colour of liquids and solid substances. The Lovibond tintometer consists essentially of a darkened enclosure with an eyepiece at one end and at the other two apertures of equal area evenly and equally illuminated by an artificial white light attachment. One

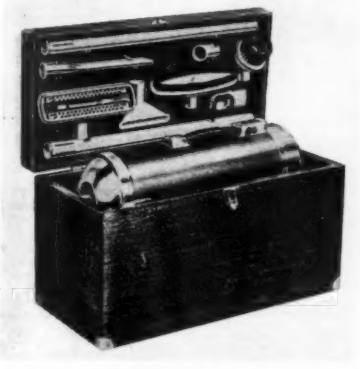
aperture is employed for viewing the sample to be tested, while light entering the second aperture is intercepted by changeable slides with which the sample under test is compared. The two fields of view are brought into juxtaposition by mirrors at an angle without the use of prisms.

Another instrument is a comparator for determining the pH content of liquids by comparison with standard colour indicators of the British Drug Houses, Ltd. Both outfits have bakelite cases.

T.M.C.-Harwell (Sales), Ltd.

The display on this stand consists of "Temco" a.c. electric clocks in a wide range of styles, including many new models of pleasing appearance. Among the latter is a selection of striking and chiming clocks as well as the "Temcolarm."

There will also be on view advance models of a new series of wall clocks designed on modern lines with dials of opaque coloured glass. These clocks are made both for hanging and for fitting flush with the wall.



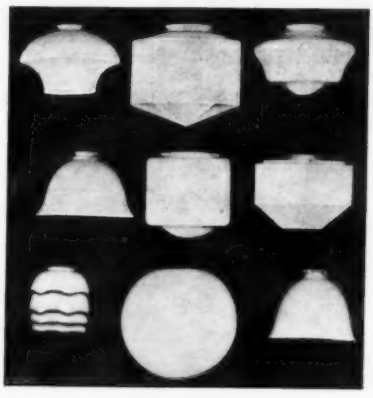
The Vac-Tric "Silent Q" with accessories

Vac-Tric, Ltd.

In this display of vacuum cleaners is a new model of the sweeper type named the "Airflo." It incorporates beating and sweeping actions, and has several other useful features, such as a head light for dark corners and a handle which allows the operator to stand in one spot and steer the cleaner in any direction. The nozzle adjuster allows for the selection of seven different adjustments for varying thicknesses of carpets, merely by foot pressure on the pedal. The nozzle height indicator and "Airflo" speedmotor provide a low speed for surface dust and high speed for deeply embedded dirt.

The "Silent Q" machine (illustrated) is of the cylinder type. A "Popular" model is also shown.

In addition to the vacuum cleaners there is a floor polisher which cleans, waxes, and polishes floors with the minimum of effort. It is sturdily constructed and finished in black and nickel and has interchangeable brushes.



Artistic examples of Webb's glassware

Webb's Crystal Glass Co., Ltd.

This is a display of best hand-made table and ornamental glassware in modern and artistic designs, as well as etched and plain glass for hotel and ships' use as made at the Stourbridge works of Thos. Webb & Sons. Opal lighting ware is produced at the associated "Duroglass" works at Walthamstow, and silvered reflectors are among the manufactures of Duro-Ray, Ltd.

Wood Electric Manufacturing Co., Ltd.

This is a large selection of all kinds of electric lighting fittings made of wood. There are examples of both floor and table standards, pendants (illustrated), electroliers, wall brackets, and reflector fittings, which are manufactured in every style and finish.

A pendant by the Wood Electric Manufacturing Co.

Preventing Corrosion. By R. Holloway

IN view of the high-quality finishes demanded to-day for electrical equipment, and because of the enormous labour and overhead costs of removing corrosion, some consideration should be given to its prevention.

Standard motor castings produced in modern foundries and free from imperfections, particularly corrosion, are often kept in the casting stores for periods extending in some cases to two years. Ultimately a casting is machined, fitted with its usual armature equipment, and finally passed to the paint shop for finishing prior to dispatch. It should be appreciated that not only has this casting increased in value very considerably, but also that it is probably required for prompt delivery to customers.

It is at this point that the finishing department realises that it has first to remove the corrosion which has taken place since the casting was first made. This applies not only to the exterior of the casting but also, in many cases, to the interior. There is a remedy for this. It is possible to treat castings at the time of manufacture in such a way that not only is the costly cleaning process eliminated at a period when the parts are of high value, but this very protective coating forms a priming coat, obviating at least one painting operation. This remedy is the application of a suitable anti-rust liquid immediately after the castings have been freed from moulding sand and fettled.

For this rust preventive to be effective it must function satisfactorily from the following standpoints:—It must not be of a greasy nature, necessitating its careful removal before painting commences, and it must be simple in application and low in original cost; it must be a satisfactory base for any subsequent finishing operation, such as stove enamelling, ordinary painting, filling and rubbing down, shellac painting or the application of synthetic coatings; it must in no way affect grinding and glazing operations when these are required on certain parts of the protected castings; and it must facilitate rapid handling after application to avoid delay in deliveries from the foundry; in no way should it interfere with any type of welding process, nor must it interfere with vitreous enamelling processes, nor be injurious to operatives; it should require only simple and cheap plant for its application.

Light castings may be treated by simple immersion. By the time the second drainer has been loaded the first drainer load is ready for handling. Larger castings may be flood painted either by gravity pouring process or spraying.

A careful check has been taken of actual cost figures, and for average work the material cost per ton does not exceed 5s. Labour costs vary in accordance with the plant available for its application. Figures taken in a modern foundry in the north-east area show a labour cost per ton of not more than 3s. An all-in cost of not more than 10s. per ton appears to be a very low premium to pay for such immunity.

I have tried to place the advantage of such protective materials before, in particular, those foundries which specialise in the production of castings which are sent to their various customers for assembly. In every case where the process has been adopted satisfactory results have been obtained.

It is common practice of electricity undertakings to-day to purchase sheet metal which is not free from corrosion. Moreover, this metal is kept in storage untreated, and corrosion is continuous. Often in the manufacture of transformer tanks plates are used which are badly corroded. I know of the damage caused in this way; the sludging effect this type of corrosion has on transformer oils; and the impossibility of satisfactorily removing such corrosion after final assembly of the transformer. Prevention of this corrosion is possible. It should be carried out at the source of supply, and there is a satisfactory material suitable for application to these parts. The same comments might cover extruded ferrous metals such as angle and channel iron.

The only period at which a protective coating is effective is when it is applied to parts which are entirely free from moisture, corrosion, and any other imperfections. It is beside the point of this article to discuss the merits and demerits of the various protective coatings, but no coating has any value unless it is applied under correct conditions. Moreover, the best protective processes have little value unless the designers of such apparatus bear in mind the exposed situations in which it is to be employed. Transformer tanks are manufactured with flat tops, strengthening angle irons also have horizontal surfaces, and radiator tubes are so nested as to eliminate any possibility of applying satisfactory protective coatings and of removing corrosion *in situ*. A coat of red oxide paint is patently insufficient.

A great amount of outdoor equipment can never be correctly protected, and unless steps are taken promptly to specify that ferrous metal shall be protected at a time when it is free from moisture, scales, corrosion and any other imperfections, there is danger ahead.

The I.E.E. Dinner

THE annual dinner of the Institution of Electrical Engineers, which was held at Grosvenor House, W.1, on February 7th, was once again a most enjoyable affair. The opportunities afforded by the subsequent reunion of meeting old friends added zest to the evening; one well-known borough electrical engineer told us that he had met a former colleague for the first time after forty years.

That the function is becoming more and more widely appreciated is shown by the increase each year in the number of members applying for tickets. This time the total was 840, which passed last year's figure by seventy.

The toast of "The Institution" was proposed by Sir H. Kingsley Wood, the Postmaster-General, who was able to state that the orders for telephone plant to be placed this year would create a new record. After a brief reference to the Television Report (dealt with by us last week) he expressed the view that the problem of interference with broadcasting would be solved without legislation.

The President's Views

In his response, the President (Prof. W. M. Thornton) referred to the representation of light-current engineering on the Council in the persons of Sir Thomas Purves (past-president) and Col. A. G. Lee (vice-president), and suggested that the precise and delicate methods by which large power supplies were controlled were a legacy of the old telegraph days. He believed that within the next twenty years everyone both within and outside the industry would be grateful for the national electricity scheme

We had not reached finality in our methods of distribution, but in this we had the advantage of the operating experience of the great power companies and of the large undertaking of the New Zealand Government. Our power sales engineers might well consider the methods adopted by that progressive Dominion, and also by the Post Office in offering a universal retail rate.

The President then mentioned the establishment this session of the Transmission Section entailing additional work on Mr. P. F. Rowell and his staff, to whom he paid a tribute that was heartily endorsed by his audience. He later foreshadowed the formation of a new Section of Electro-Acoustics. He hoped that electrical engineers would not lose sight of the fact that the "vitamins" of our profession were the facts or laws discovered by physical research. Our race had been able every fifty years or so to throw up men of supreme genius owing to a capacity for intense and prolonged thought and work, commonsense, a power of associating facts and ideas, and an acute "sense of the trail."

The great technical societies were the modern counterpart of the mediæval guilds, to which we owed so much. These were chiefly concerned with the maintenance of a good standard of work, education, and the help of members in distress. The I.E.E. examined, partly in co-operation with the Board of Education, about 3,000 students each year. He urged that there should be a generous response to the recent appeal for more subscribers to the benevolent fund.

A surprise item followed the President's speech in the form of the conferring on Mr. P. F. Rowell, the general secretary, the cross of an Officer of the Legion of Honour. Mr. J. Grosselin, the secretary of the Société Française des Electriciens (deputising for his president, Mr. H. Milon), acted on behalf of the French Government, and Mr. Rowell returned thanks in a brief speech in French. The president had previously read a telegram expressing good wishes of the Société and the Société Belges des Electriciens also sent greetings.

Mr. R. P. Sloan (vice-president), proposing the toast of "The Guests," mentioned the presence of Mr. J. W. Dulanty (High Commissioner, I.F.S.), Sir Wm. Redmayne (pres., Inst. C.E.), Mr. C. Day (pres., I.Mech.E.), Sir Frank Smith (Dept. of Scientific and Industrial Research), Sir Wm. Bragg, Messrs. J. Grosselin, M. H. Damme (president, Dutch Institution of Engineers), Lord Stonehaven (pres., I.N.A.), Messrs. C. V. Bennet (pres., I.Gas E.), and Frank Hodges (C.E.B.), Sir Henry Pelham (Board of Education), and Sir Cyril Hurcomb, who represented the Minister of Transport. The speaker also paid a tribute to the Minister and to Sir Archibald Page, chairman of the Central Board.

Sir Richard Redmayne and Sir Henry Pelham responded in speeches most apt to the occasion.

The Electrical Engineers' Ball

The Electrical Engineers' Ball on the following night attracted 1,050 people, about 200 in excess of last year. In addition there was an unprecedented demand for tickets during the last few weeks. While it was good to hear of the support given to this function in aid of the benevolent fund, we were sorry to miss many regular attenders who made application too late. The old ice rink at the Grosvenor Hotel made a fine ballroom and provided ample space for the large company which, from representative views which we heard expressed, appeared to regard it as the most successful function of the series yet held.

The Trend of Electrical Research

THE luncheon on the occasion of the fourteenth annual general meeting of the British Electrical and Allied Industries Research Association was held at the Savoy Hotel on February 8th. The chair was occupied by Prof. J. C. McLennan, whose researches at Toronto University, Canada, into electrical conductivity at extremely low temperatures are well known.

Following the loyal toast Sir Frank E. Smith, secretary of the Department of Scientific and Industrial Research, proposed the toast of "The E.R.A." He thought the engineer was right in leaving the determination of the nature of electricity to workers in pure research, whose discoveries eventually led to the formation of new industries not dreamed of at the time the discoveries were first made. Research would need to go on for a long time yet; for instance, the nature of dielectrics would not be fully understood during the lifetime of present subscribers to E.R.A. Sir Frank hoped that the financial scheme which had been evolved would prove to be a success. An industry with a turnover of £80 millions could well afford to make it so. Referring to the new class which Mr. E. B. Wedmore had called "Manufacturing Members," Sir Frank observed that if Mr. Wedmore could devise means of manufacturing new members he would solve a number of the Association's problems.

Discharge Lamp Progress

Prof. J. C. McLennan (president for this year) in responding, remarked that the Association's financial prospects should make it a still more useful organisation. It was one of the "big three," cotton and instruments being two other large sections, and the problems it had in hand were all of vital interest to the electrical industry. When these subjects had been dealt with properly they would return to illumination, to the giving of light and health to humanity. Physicists had learned to appreciate the light that atoms emitted, which had led to the development of enclosed gas-arc illumination. Such discharge lamps would soon be challenging the position of filament lamps. Prof. McLennan suggested that the Minister of Transport should turn his attention to the lighting of main and arterial roads, which could now be done efficiently and economically.

One-millimetre Waves

Research achievements in thermionics, he said, had given great aid to civilisation, short waves greatly helping the art of communication and medical science. Some means of producing waves as short as one millimetre was badly needed by physicists. In the application of short waves the relation of frequency and the conductivity and dielectric constant through which the waves passed was of material significance. The X-ray treatment of cancer and other malignant growths was going forward strongly and an endeavour was being made to use 1,000,000 V for this purpose (present X-ray tubes would only withstand about 400,000 V). At such a high voltage it had to be considered what sort of rays, besides X-rays, would be produced. The action of such emissions on human tissue needed to be further investigated before their therapeutic value could be fully exploited. All these matters reacted upon the electrical industry and stimulated the production of equipment.

For the transmission of power over long distances the use of d.c. had been suggested in place of a.c., while in the U.S.A. it was proposed to generate energy by means of charged rotating discs and to transmit it 250 miles along a wire contained within vacuum tubes. Prof. McLennan said he would not care to undertake to keep those tubes evacuated and for the present would rather rely on cables; nevertheless the dreams of physicists had an awkward habit of coming true.

Mr. A. Berkeley, deputy chairman of the E.R.A. Council, proposed the health of the chairman, who responded briefly.

Sir Frank E. Smith K.C.B. C.B.E. D.Sc., LL.M., F.R.S.
& the P.M.G. The Rt. Hon. Sir Kingsley Wood M.P.
may introduce the Public to Television & Other Wonders
Miss Caroline Haslett C.B.E.
Professor W.M. Thornton O.B.E. D.Sc., D.Eng.
THE PRESIDENT, - & a popular COMPANION →
M. J. Grosselin "L'Entente Cordiale"
I won't be drawn
The Ipswich Borough Elec. Engineer - taking an Easy
← Mr. A.E. Blackiston
Mr. T.P. Williamson
Mr. P.T. Wheelwright
Mr. E. Rayner
Mr. R.H. Tree - was present to see - - a Bigger & Brighter - I.E.E.!
Mr. R.H. Bartley Chief Engineer Auckland N.Z. Power Board
1871

Well-known Figures at the I.E.E. Dinner

MEETINGS AND DISCUSSIONS

Current Topics and Opinions Expressed at the Institutions

The Progress of Television

THERE was a large attendance at the monthly meeting of the GLASGOW UNIVERSITY ENGINEERING SOCIETY on February 7th, when Prof. G. W. O. Howe spoke on "Television: its progress and present position."

The lecturer discussed methods of "scanning" a picture, and explained why the Post Office had compelled the B.B.C. to keep to the rough system of a 30-line base scan on the ordinary broadcast wavelength. With a wavelength of 300 m. the frequency of the carrier was 10^6, and when modulated by a frequency of 500,000 the side bands ranged from 1,500,000 to 500,000, which represented wavelengths of 200 m. and 600 m. respectively. A frequency as high as 500,000 was necessary for high-quality reproduction, but, as the example indicated, interference would be caused on all wavelengths between 200 and 600 m., since gradations of depth of colour from white to black produced side bands of considerable width, which ranged over the normal sound broadcasting spectrum. Up to the present the B.B.C. had transmitted pictures 7 in. high by 3 in. wide with 12½ pictures per second, giving, on a scanning base line of 30, a frequency of 12,500 periods per second. It was agreed that such a system could produce only crude pictures with a considerable amount of flicker.

[*H. J. Whitlock & Sons*
Prof. G. W. O. Howe

On a 10-m. basis, proceeded Prof. Howe, the side bands would range from 9.85 m. to 10.17 m.; on a 7-m. basis the figures would be even better, and interference with other services would thus be kept within narrow limits. The method of scanning in this country was from the bottom right-hand side upwards, but in Germany the practice was horizontal, beginning at the top left-hand corner. A good deal depended upon the nature of the picture and whether the light and shade varied chiefly vertically or horizontally.

The electrical eye which scanned the picture, said the lecturer, was invariably a photo-electric cell furnished with a powerful light source; when the grid was primed with an appropriate voltage the cæsium of the cell responded to changes in light reflected from the picture. By the Baird and Nipkow scanning spiral disc or the Weiller mirror drum methods each spot on the picture was illuminated in turn; the photo-electric cell converted the light waves into electric waves, which, after amplification, were sent out from the aerial.

One of the difficulties of transmission was insufficiency of light on the picture or scene. When the whole picture was flood-lighted elaborate make-ups were needed by artists being televised. In another system the subject was kept entirely dark and was only spot-lighted by the scanning light source through the apertures in the spiral disc or from the mirror of the Weiller drum. Baird produced a system in which the "picture" sat in total darkness, infra-red heat rays being used to spot the subject. One of the most promising methods of transmission was the production of a cinema film of the subject first, and then transmitting from the film through its light and shade. The time interval had been reduced in a special case to 15 seconds, but no one could really object to seeing, say, the finish of the Derby one minute later.

To secure perfect synchronisation between the transmitting and receiving apparatus, Baird drove his receiving disc by a d.c. motor with a La Cour phonic wheel on the same shaft. The speed was maintained constant by the utilisation of a black band along the top of the picture, the traversing of which by the spotter sent a correcting current to the electro-magnets which operated on the teeth of the phonic wheel. Corrections in speed were thus sent at the end of each vertical scan. The receiving stages might contain one or two h.f. amplifying circuits, then a rectifier which produced one side band only. Ordinary electric lighting was of no use, owing to its lag, but a neon tube would follow the fluctuating volts at a frequency of one million per second. The Karolus system was quite successful, with its two Nicol prisms and a Kerr cell between them. The varying p.d. incoming from the aerial and impressed upon the plates of the Kerr cell regulated the intensity of the light and reproduced the light and shade of the picture. The Kerr cell was water-cooled if high c.p. were used. Recently, promising results had been obtained from the cathode-ray tube.

Metallic Rust-proof Finishes

THE second of a series of six technical lectures arranged by the BUILDING CENTRE in London was delivered on January 31st, by Dr. I. G. Slater, who dealt with "Metallic Rust-Proof Finishes for Architectural Ironwork."

The speaker said that apart from direct chemical attack, corrosion might be promoted by electrical processes which could take place when two dissimilar metals were joined together in the presence of a suitable electrolyte. Metals differed markedly in their tendency to dissolve when immersed in an electrolyte. The greater the difference in the solution pressures of the two metals, the greater was the degree of protection afforded by one metal to the other, *i.e.*, the difference of potential at the interface between a metal and its solution of normal ionic concentration in which it was immersed.

Most metals which were used commercially for protective coatings could be deposited as firmly adhering films directly on the surface to be coated by electrolysis of suitable salt solutions. It was possible to regulate with great exactitude the thickness of the deposit, so that this process was under more complete control than other methods.

Electrodeposited coatings consisted of the pure metal (other than when definite additions were made to the plating solution) without intermediate layers of alloy, the absence of which enabled a properly prepared electrodeposited zinc coating to withstand severe bending or other mechanical deformation much better than other types of zinc coatings of equivalent thickness.

Electroplated chromium coatings had only been commercially developed during the last ten years. Their value lay in the great hardness of the coating and its ability to take a very high polish, which was retained under severe corrosive conditions. Cadmium coatings were also produced by electroplating and would take a high polish, at the same time affording electrochemical protection to iron, thus having the more attractive appearance of nickel with the protective value of zinc.

An artificially produced iron oxide layer, if of a suitable type, was much less permeable to corrosive environments than was the oxide layer produced by normal atmospheric corrosion. But such coatings were as a rule much inferior to true metallic coatings, since they protected the underlying metal only in a mechanical way. Good results were claimed for a process of electrolysis with the iron used as the anode in a suitable solution.

Radio Communications in Mines

EXPERIMENTS in underground wireless signalling are described in a paper by Mr. C. H. Roddis that was read before the London Branch of the ASSOCIATION OF MINING ELECTRICAL ENGINEERS on February 5th. The author outlines numerous attempts that have been made to establish radio communication both by "wired" and "wireless" means in mines, but points out that "the going is far from easy."

Since the apparatus being used is made for surface operation it does not comply with official regulations which might govern its use in a mine proper. Tests with equipment of varying designs are proceeding in the experimental mine at Birmingham University. The investigators, however, are dependent upon other work for a living, so that progress is slow and no reports that can be considered promising have yet appeared.

The branch president (Mr. F. C. Knowles) said that if something could be done in this direction it would be of great assistance in mines, not only in cases of accidents but also for normal everyday transmission. He mentioned that a map by Mr. Broughton Edge showing the resistivities of the soil of the United Kingdom to a depth of about 500 ft. was published recently by the British Electrical and Allied Industries Research Association. Telephonic interference due to high voltage lines was affected by the resistivity of the earth.

The work being carried out at the General Electric Co.'s

laboratories in connection with underground wireless communication was referred to by Mr. Richards, who said that a difficulty was to determine what was the ultimate or immediate object of such communication. With a transmitting set at the pit top it was comparatively easy to establish communication with the pit bottom; but it was rather more difficult to establish one-way communication between the pit top and the inside workings. To obtain communication from the pit workings to the pit bottom was extremely hard because of the difficulty concerning the portability of the apparatus.

Other problems, said Mr. Richards, were whether the spark created by such a set would fire gas, and whether the Mines Department would agree to the set being used. At the research laboratories it was felt that a system of wired wireless would represent the immediate solution of the difficulty, perhaps using the tram rails, but that did not overcome the original difficulty with regard to two-way communication. Mr. Richards added that his company was still carrying out research on ultra-short waves.

Mr. Roddis, replying, said the equipment must be enclosed in a steel case, but electrostatic absorption was possible. The steel plate was highly charged and a man could draw a spark to himself from any screen around the set, which made insulation necessary. There must be no bare metal parts. Mr. Roddis agreed that wired wireless presented an immediate solution.

An experience when falls had brought down the telephone lines underground was related by Mr. J. W. Gibson (past-president of the Association). The ordinary system was being used, having a single wire and earth return. He put down earthplates where the break had occurred at the inbye and at the outbye, and the telephone system had worked for weeks without giving trouble. When experimenting with a view to communicating between two seams about 10 fathoms apart with earthpoles and earthplates spaced about 40 yards apart he found that although perfect telephone speech was obtained he could not produce ringing.

In reply to Mr. J. W. Macdonald (branch vice-president), the author said an insulator might hold a charge for a period and then discharge it at an inconvenient moment; but the Mines Department could specify the requirements in respect of the materials to be used.

Cooling Electrical Machines

THE advantages of propeller fans for the cooling of electrical machines is an aspect which is covered in a paper by Mr. Ralph Poole that was read before the INSTITUTION OF ELECTRICAL ENGINEERS in London on February 14th. The author recently dealt with the theory and design of this type of fan in a selected paper of the Institution of Civil Engineers. He now draws attention to the flexibility of the type as compared with the centrifugal fan.

It is noted that special tests have shown the advantages of a fan designed according to modern aerodynamics over the simple "paddle wheel" type of fan. Reference is made to fans designed to give maximum slip-stream rotation. The windage efficiency of a machine with a fan is far more important than that of the fan alone, and the most efficient fan does not necessarily give the most efficient machine. Great care must be taken in computing from friction and windage tests the actual power taken by the fan, which can be designed to rotate the air more efficiently than can the machine itself; the increased fan power may be more than balanced by the reduced machine windage.

The author stresses the need for good inlet conditions for the satisfactory operation of propeller fans. Tests made upon a turbo-alternator illustrate the effect of guide vanes in the air intake to propeller fans, and both circumferential and radial guide vanes are essential. Discussing the problem of external fans for cooling large turbo-alternators, he shows that two fans in series on a variable load permit greater efficiencies and, therefore, greater flexibility, than two fans in parallel.

High efficiencies are claimed for a special "Metrovick" scheme of series propeller fans which simplifies the dampers in a turbo-alternator ventilation scheme. Propeller fans can be designed to suit almost all machines; the deciding feature is ultimately cost. For high pressures it is essential that the radial tip clearance shall be small in the case of a propeller fan, but this requirement increases the cost considerably. The final decision, therefore, rests between cost and efficiency and is a matter for the customer rather than the manufacturer. In certain cases the propeller fan is quieter than the centrifugal fan, but in general the former requires more careful design to prevent noise. Special attention is being paid to this problem, and much useful information has been obtained from recent experimental work, the results of which may shortly be published.

Incidentally it is stated that the propeller fan is most suitable for cooling transformers. It is possible that in the near future transformer cooling will be dealt with as a separate subject, since the type of fan, high-pressure or low-pressure, may determine the arrangement of cooling tubes. While forced ventilation may become economical, this is a matter for further investigation by transformer designers.

Multiple Retort Stokers

AT a meeting of the London Technical Group of the ELECTRICAL POWER ENGINEERS' ASSOCIATION on February 4th, a paper on "The Multiple Retort Gravity Underfeed Stoker," by Mr. W. M. Dodds, was read and discussed. Mr. G. W. Bendix, chairman, recalled that only three or four years ago many engineers had predicted the end of the mechanical stoker, at any rate for boilers of more than 200,000 lb. per hour evaporative capacity, but the manufacturers had been able to contradict that prediction in a practical way.

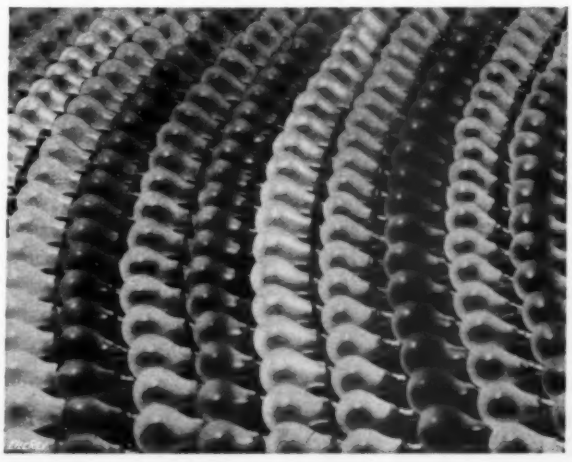
In the view of Mr. A. Pollitt the paper contained evidence that with a well-designed plant a very satisfactory efficiency could be obtained. As an average over a period of five months or more, the loss due to carbon in the ash in the Battersea plant had not exceeded 0.3 per cent. of the total heat in the coal as fired, coincident with a well-sustained CO_2 performance, and the combustion heat efficiency in normal operation, had been approximately equal to that obtained on test. The limitations which stokers at one time tended to impose on boiler capacities had been to a large extent removed.

The flexibility of stokers, he said, was of increasing importance. As the ratio between the load and the number of stations supplying the grid increased, a large saving in capital expenditure would result if each station were able to carry substantial peak loads for short periods. The paper seemed to indicate not only that these peaks were possible, but that they could be obtained very quickly. The falling off of evaporating capacity on shutting down the induced and forced draught fans was amazing.

Preheated Air

Mr. L. Morton admitted that the use of preheated air had added to the economy of performance where high air temperatures had been attempted, but he pointed out that the anxieties of stoker designers, manufacturers and users had undoubtedly been increased, and that the permissible temperature of preheated air offered a very fruitful field for discussion. The author's reference to the possibility of considering temperatures of 600 deg. F. with "impunity" called for comment. Partially water-cooled grates might considerably reduce the maintenance costs of stokers with high-temperature air.

In reply Mr. Dodds said it was possible to build a double-end stoker for an evaporation of 1,300,000 lb. of steam per hour. Proposals for such stokers had been submitted and were under consideration by an eminent firm of consulting engineers at the present time. The multiple retort stoker could accommodate air temperatures of 500 deg. F. and more (whereas other stokers could not) because the structure of the stoker did not move; it was suspended and supported on roller bearings at the rear, and its framework was fixed at the front, similar to modern bridges. For this reason the



The lamp manufacturers are in a position to meet all demands for the Jubilee illuminations

stoker was able to adjust itself to high air temperature immediately. Not only was the stoker free to expand longitudinally, but, being built in sections across the width, the expansion of any one retort section was confined to that section, and there was no cumulative expansion across the width of the grate.

Maintenance costs of grates working under the lower air temperature conditions of 350 deg. F. were, in some plants, as low as ¼d. per ton of coal burned, and in some cases as high as 2d. Most of the stokers working with high air temperature had special grate surfaces, in some cases carborundum.

The type of stoker discussed in the paper differed from the usual in that, by adjusting pusher strokes, the coal was adjusted on the grate in order to create a uniform resistance to air flow. When higher fuel burning rates were attempted, for example in the region of 75 lb. per sq. ft., the air supply in the retort stoker would be regulated by meter control to each portion of the fire, in addition to the regulation of the fuel supply. About ten weeks was an average time for continuous running.

Mr. S. Nodes said he could not quite follow how "push-buttons" and "U" tubes containing coloured liquid could really give automatic control, unless the author used television. Mr. J. Garrard, dealing with the Taylor stokers at the Deptford (West) station of the London Power Co., said that their general operation had been satisfactory and they were reliable. A CO_2 figure of 14 to 15 per cent. was easily maintained, and the ash pit losses were under 1 per cent. The cost of maintenance worked out at just over threepence per ton of fuel burnt; this was rather high when compared with chain grates, which at Deptford (West) had cost 0.815d. per ton to date. In considering these figures one should bear in mind that when a retort stoker was repaired its original condition was restored, whereas in a chain grate stoker the wear continued for four or five years and then it was generally necessary to strip the grate and put in 30 or 40 per cent. of new links.

The retort stoker, said Mr. Garrard, had the advantage of considerably better reliability; good combustion conditions were more easily maintained (with suitable fuel) and repairs were more quickly carried out. As against this the chain grate was able to deal with a larger range of fuels, and was more easily handled when burning poor-grade fuel. In the event of boiler trouble the large mass of fuel on a retort stoker would be difficult to deal with. Mr. H. Mount said he would not like the meeting to gain the impression that the Taylor stoker was the only one which could provide an area of 750 sq. ft. Chain-grate stokers were made up to 22 ft. wide. There were single-width stokers up to 18 ft. long, thus giving a total grate area of 396 sq. ft. A twin stoker would give an area of 792 sq. ft., and by adding another foot to the length of the stoker an increase of area of roughly 5 per cent. to 840 sq. ft. was secured. Mr. Dodds had stated that the Battersea stokers had the largest grate area, whereas the Hudson Avenue stokers were the biggest from the point of view of evaporation. The retort stoker area at Battersea was 752 sq. ft. Two of the Hudson Avenue stokers back to back would have an area of 1,400 sq. ft.

Welded Steel Frames for Marine Engines

THE design and construction of welded steel frames for marine oil engines is discussed in the paper by Mr. C. H. Stevens that was read before the INSTITUTE OF MARINE ENGINEERS in London on February 12th.

A description is given of three types of frames as actually constructed for main engines, together with line drawings and photographs of the frames in various stages of construction. Some auxiliary engines are also briefly described and illustrated in order to show the general adaptability of the method of design to varying sizes and types of engines. The advisability of separate cylinder water-cooling jackets is mentioned, and means suggested for such an arrangement. The removal of the crankshaft for repair or renewal is discussed, particularly in connection with welded steel frames. A large-scale model was put together during the meeting to demonstrate how the plates are cut and fitted.

The author refers only to his own practice and experience in the adaptation of his patents and ideas to oil engines of the four-stroke single-acting type. The methods are, however, equally adaptable to two-stroke or double-acting types. The main feature of the designs described consists in the fact that the primary load due to compression and ignition is not transmitted through the welding, but is carried by the steel members themselves, and transmitted from one to the other through metal contact, and also by being contained within a single member which surrounds the forces. An exception to this rule is seen in some designs where a portion of the primary load may be transmitted from one member to another through welds in longitudinal shear.

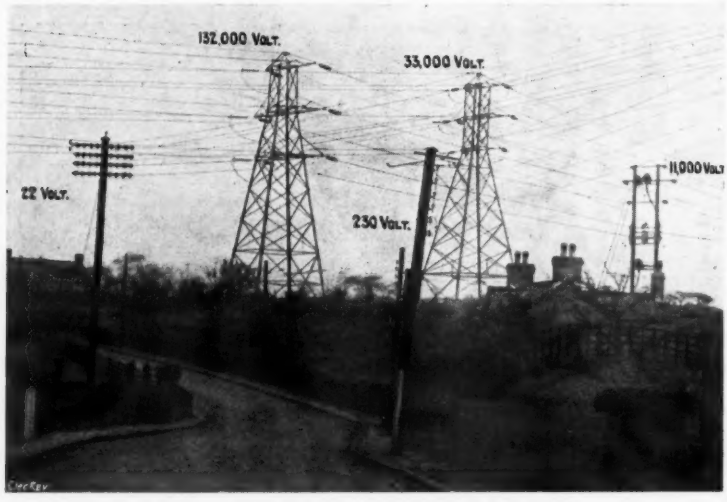
The transmission of the primary load through welds in cross shear is avoided, because in the author's experience welds so loaded may become unreliable in structures, such as engine frames, where the loading alternates between zero and maximum, and is frequently reciprocating and necessarily accompanied by a certain amount of flexing in varying degree. Thus, generally for load transmission, the welding is of secondary importance, its function being to consolidate the assembled members. That does not mean that welding of a poor quality would be good enough for the job. To that end the positions of the welds, the access to them, and a correct welding attitude are matters of the first importance.

All the welding should be downwards, *i.e.*, gravity welding, and therefore the engine frame must be placed in the most favourable position for each weld. Thus during the progress of the welding, the frame may be vertical, upside down, on its side, or at any angle, as best suited to the particular weld in progress. The welds are practically all fillet welds and their dimensions are arranged in accordance with the various thicknesses of plates.

The first marine engines to be fitted with framework designed on these lines were those of a submarine, for which the columns and entablature with cylinder liner housings were made as two monoblocs joined by a bolted connection at the top of the central bay, each monobloc comprising three cylinder lines. They have been in commission for some time.

Railway Research * * *

The functions of a research department are outlined by Mr. T. M. Herbert, of the L.M.S. Railway Research Department, in a paper that was read before the INSTITUTE OF FUEL in London on February 13th. The paper is concerned mainly with certain aspects of organisation, and the author does not suggest that the precise type described will be suitable for every industrial undertaking, since a railway company differs from most other industries in the unusual diversity of its interests. At the same time the main principle of an independent staff of scientific experts has, it is contended, been shown to be sound, and most of the reasons for its adoption should apply in greater or less degree to a very large number of other firms. It is, perhaps, in the capacity of scientific consultants that the most rapid progress has so far been made, and it is by dealing effectively with individually minor problems that confidence is most rapidly developed. An early success always brings further work in its train, and there is undoubtedly a growing tendency to use the research department as a source of impartial advice.



A riot of wires in South Wales

This "Wireless" Age

The accompanying photograph taken between Neath and Swansea shows a rather unusual collection of electrical systems bunched within a few yards of each other. The two "pylons" carry the 132-kV and 33-kV grid primary and secondary mains, while to the right of these on the "H" pole is the local 11-kV transmission system. In the near foreground to the right is the local 230-V distribution network, and on the left a 22-V G.P.O. local telephone service line pole.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Stray Current Electrolysis

The paper contributed to the January *Journal* of the Institution of Electrical Engineers by Mr. C. M. Longfield, opens up an important question in view of the increased electrification in this country and the multiple earthing of distribution systems.

It appears from Mr. Longfield's paper that he has been able to reduce cable faults to a very large degree by the application of drainage valves, which are prohibited in this country. The problem is one which affects all classes of engineering as gas and water distributors are equally involved with electricity suppliers and communication systems.

Owing to the rapid development that is taking place in all these public services, the time appears ripe for the collection and study of data with a view to the modification of legislation if necessary. The existing legislation remains practically the same as in 1893, since which date all the developments in electric traction systems have taken place; further, the legislation appears in some cases to bear unduly heavily on the distribution authorities.

London, N.1, *Feb. 7th.* L. H. Peter, M.I.E.E.
Chief Electrical Engineer.
WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD.

The Consumer's Meter

In your issue of February 1st the report of proceedings taken by a supply authority to recover payment, dating back over a period of three years, from a consumer who had been undercharged due to an error of the authority's meter reader, is particularly interesting to me in view of a recent experience in connection with my own domestic supply.

I notified the authority that I strongly suspected my meter to be faulty, and after correspondence had passed the authority informed me that it was satisfied that the meter was in order but, for our mutual satisfaction it would arrange on receipt of an advance payment of 10s. 6d. for an independent test. I should perhaps add that in the meantime a man had been sent to test the meter *in situ*. I preferred, however, to keep a close watch on consumption during the next few quarters, and accordingly advised the authority to this effect, adding that if subsequently I should decide to ask for an independent test and the meter was then found to be faulty, I would expect rebate back to the period when I first reported the suspected inaccuracy.

To my surprise I received the reply that rebate would only be allowed for the quarter in which the meter was proved to be faulty.

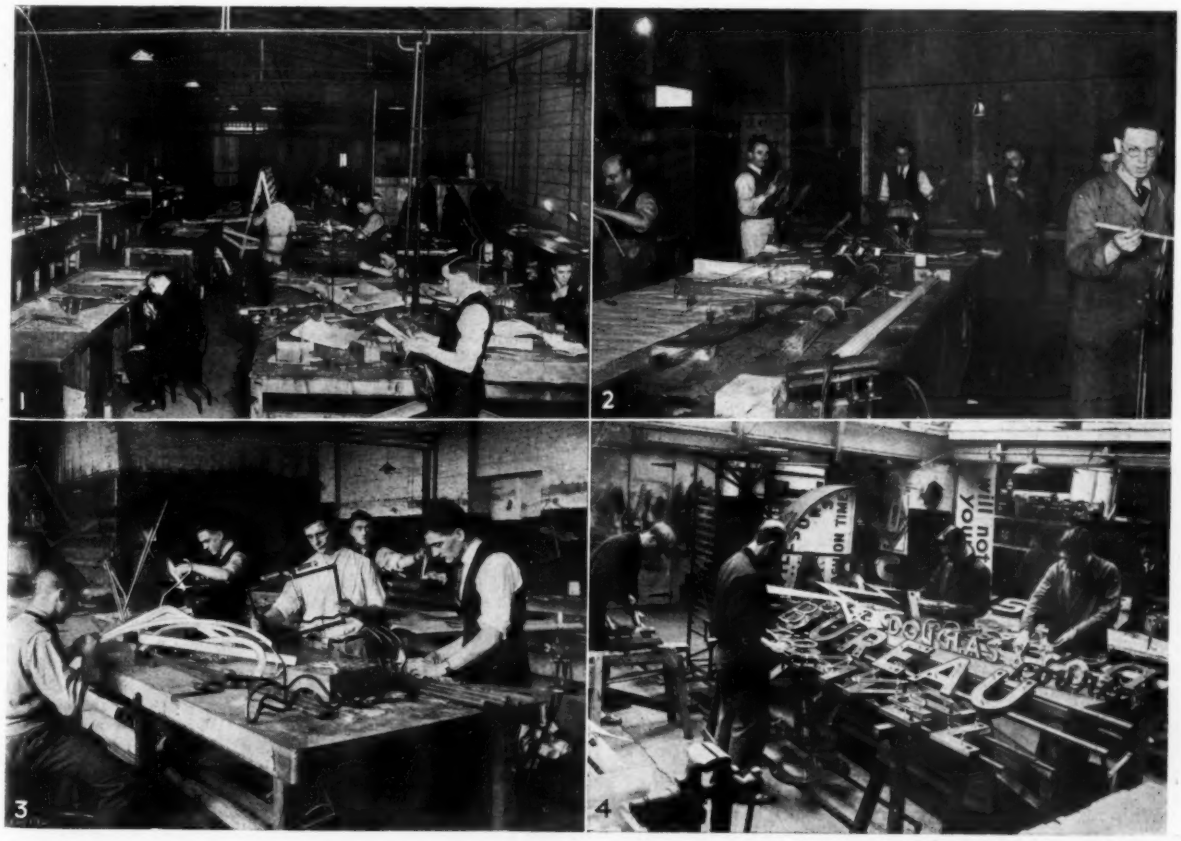
In view of the report to which I have referred it would be interesting to know whether the authority's statement is merely its practice or whether it would be supported in law.

February 7th. CONSUMER.

Earth Leakage Trips

In his article of February 8th Mr. Gilbert refers to an earth-leakage trip "supplementing" a main earth and suggests that the framers of I.E.E. Regulation 1005 C. did not contemplate parallel circuits. Possibly the word "substituted" was intended; if so, the Regulation would require, in the event of an earth resistance exceeding 1 ohm, the earth connection to be replaced by a leakage trip to operate at not more than 30 mA. In my view the Regulation was intended for circuits within a building, the framers of the Regulation not considering services, which come within the province of the supply authority; otherwise something would have been stated about volt rise or unbalanced current due to insulation defects.

While appreciating the objection that Mr. Gilbert has to parallel earths there are instances where this is an advantage. When working out the design of a general purpose service switch consisting of cable splitter and 50-A switch I provided a 1-A 1-ohm wax thermostat as a standard release, the thermostat being connected in the main earth circuit. For rural services a magnetic release is provided as a separate attachment which may be added to the main unit when required and directly actuates the trip mechanism of the latter. The magnetic release is connected to a separate earth, but only functions if the main earth *via* the thermostat does not prevent a potential rise of 40 V—a possibility in dry seasons when the ground resistance increases. By this means small leakages due, for example, to a pan boiling over on a cooker, cannot interrupt the main supply, but a serious potential rise is prevented. By introducing a new principle, the magnetic trip will directly



Electrical illuminations in the making: Our pictures give glimpses into the works of (1) Claude-General Neon Lights, Ltd.; (2) the Brilliant Sign Co.; (3) Maple's; and (4) Electrolumination, Ltd.

release the switch with 15 mA at 40 V, and with 230 V applied can operate against an earth resistance exceeding 12,000 ohms. It is not affected by normal vibration.

By making a service switch unit in sections which can be combined, operating conditions can be met or changes provided for without disturbing the meter connections; thus if a separate earth wire is provided for a group of rural services the magnetic trip is not required, the earth connection is made through the wax thermostat and the earth wire has only to carry the small tripping current. If the same switch is required for a town service where the water service is unsuitable for a 50-A leakage current, the wax thermostat is shunted so that a leakage of, say, 10 A will trip the switch. The switch may also be tripped by means of a current transformer, the secondary of the latter heating the thermostat when the switch acts as a current limiter. A. G. BULLEN.

Liverpool, *February 9th.*

In spite of the tardy recognition given to it by the I.E.E. Wiring Regulations the earth-leakage trip does not appear to be understood or welcomed. This, I fear, is inevitable. Apart from the fact that the Regulations are very far from being generally known (they simply do not exist for a great section of the industry) a device must make a widespread appearance upon the market in practical form before one can hope for the innovation to become known. With the arrival of a small, well-made, practical and economic earth-leakage switch there will be some possibility of the idea in time capturing the wiring industry.

The Wiring Regulations and (if he will forgive me saying so) Mr. Gilbert's propagandist writings reach and are digested by a comparatively small section. I consider that it is high time we learnt of typical installations in this country wherein leakage switches are employed. Has Mr. Gilbert, for example, been responsible for any and can he give wiring and maintenance details?

Mr. Gilbert suggests that meter readers could check the operation of earth-leakage trips by means of the test-key. I fear that this would never appeal to supply authorities; indeed, I think it a rather despairing idea. I feel very strongly that the switches should only be operated by means of the "test key" (*i.e.*, electrically), and therefore be constantly checked for integrity.

Most certainly let us have switches of shock-proof material; the "all-insulated" idea is fast spreading. In time we may hope in most installations to render earthing (which inevitably includes earth-leakage trips with earth connection) unnecessary.

Are these earth-leakage trips effective? Will the industry use them if they appear in reasonable form? The sooner we reply decisively the better. G. E. MOORE.

Sunderland, *February 9th.*

Electrical Accidents

The letter of Mr. C. S. Davidson which appeared on page 828 of your issue of December 14th, 1934, has been brought to my notice.

I should like to place on record that I have no information of any district in Bengal which has been changed from a.c. to d.c. As your correspondent considers that this has a considerable bearing on the subject of eliminating accidents, I shall be grateful if Mr. Davidson can furnish particulars of the district to which he refers. J. W. REDCLIFT,

Electrical Adviser and Chief Electric

Calcutta, *January 18th.* *Inspector, Bengal.*

The I.E.E. Regulations and Water Heating

The new edition of the I.E.E. Wiring Regulations will probably have an adverse effect on the progress of the industry, more particularly with regard to water heating, unless they are modified to some extent.

Earthing the framework of an electric fire may add to, instead of reducing, the possibilities of danger. In many situations it consists of introducing an earth where one did not exist before, whereas previously a child could prod the element of an electric fire without risk of a flash. The most difficult situation of all is brought about by Regulation 1002, which invites us to straggle earth and equipotential wires across the marble or tiled walls of the bathroom. We cannot even install a harmless immersion heater in the hot-water tank if it happens to be within the portals of the bathroom without bringing this regulation into force even when the tank is hidden inside a linen cupboard. To enforce this regulation will lead to a definite loss of business.

With regard to the self-contained storage heater it would appear necessary for manufacturers to introduce a model with an outer case completely made of insulating material if insulation difficulties are to be avoided. Even the spout and the cold water feed pipe would have to be completely shielded to comply exactly with the Regulations.

The number of fatalities caused by electricity are very few and they are certainly not on the increase. There are far more fatalities caused by gas, and yet it has not been found necessary to introduce such stringent regulations to govern its use. If these regulations had been issued by a Government Department instead of by the I.E.E., the whole industry might, with very good reason, have raised an outcry against the injustice of them. If a person is injured or killed by an electrical appliance on hire he will probably obtain heavy damages, but if a similar accident occurred with gas apparatus it would be very difficult to prove negligence on the part of the gas company.

Fortunately the regulation cannot be legally enforced at the moment, and the majority of supply authorities are "maintaining a benevolent neutrality" as one engineer neatly put it. Nothing will be done for another twelve months, and perhaps by that time better counsels will have prevailed.

The consumer would have been better served if the new regulations had given the supply authorities some powers to deal with the question of bad workmanship and the use of inferior materials. The quality of the materials used in the wiring of some of the new houses is so poor that the installations will probably require completely rewiring at the end of two years. There is little doubt that the majority of these materials are of foreign manufacture.

The danger of a consumer taking a cheap bowl fire into his bathroom is far more likely than the possibility of an immersion heater breaking down in such a way as to cause a fatality. A consumer cannot be prevented from using portable apparatus in his bathroom if he so chooses, and this is really responsible for the majority of accidents.

The new regulations would have made this possibility far more remote if they had prohibited the use of lamp holders in such situations. The lighting could be effected from a lamp behind a fixed glass panel in the ceiling. To go into the room or roof above in order to replace a burnt-out lamp would not impose so great a hardship on consumers as to meet the requirements of the current regulations.

It will be interesting to hear the report of the E.D.A. Water Heating Committee when it next meets. I feel that one may expect at least a few amendments to be forwarded to the committee which was responsible for the formulation of the regulation calling for the equipotential wire. J. R. HICKMOTT.

Ewell, Surrey, *February 9th.*

Travelling Showrooms

The articles which appeared in a recent issue of the ELECTRICAL REVIEW regarding the G.E.C. travelling showroom and cooking campaign are extremely interesting, and that company and other manufacturers and electricity suppliers who have adopted similar methods are to be congratulated on their initiative and enterprise.

It appears that they realise that in order to get results it is necessary to take the fight into the enemy's camp, and I trust by now their efforts and methods have received the consideration of other manufacturers and also of E.D.A., for there can be no doubt that a system of organised selling raids into the various centres, showing only the very latest appliances, all new models, irrespective of their country of origin, arranging demonstrations and checking up each centre for out-of-date models would be of great assistance, not only to supply authorities but to the trade in general.

I consider this method of educating the public far superior to film shows, and I am not speaking without experience of films. H. C. P.

February 11th.

The Heating of Steel Tubes

It is well known that if two or more conductors of the same a.c. circuit are each carried in separate steel tubes, the tubes will heat up when a fairly large current is passed. This point is dealt with in one of a series of articles in a technical journal, and the following words are used: "The result is that current is induced into the conduit which is really a closed electrical circuit, or the secondary coil of a transformer of one turn."

I submit that the above is wrong, in that it suggests that an electric current circulates round the tube *at right angles* to the primary current in the cable. What passes round the tube is *magnetic lines of force*, not electrical currents; the continual changes in these lines may well heat up the tube through molecular friction. Any electrical potential generated must be, not round the tube, but *along its length*; this is the analogy to a transformer, in which the primary and secondary must be parallel to each other, not at right angles. A. O. G.

February 8th.

Parliamentary News (BY OUR SPECIAL REPORTER)

ON February 7th the House of Lords considered in Committee the Electricity (Supply) Bill.

On Clause 1 (arrangements between the Central Electricity Board and authorised undertakings) Lord Mount Temple, who had several amendments on the order paper, said he understood that consultations had taken place between the Government, the Central Electricity Board, and those interested in the industry, and an agreement had been arrived at which would obviate the necessity for his moving the amendments. He would formally move the first amendment and await the answer which the Government would make. If, as he hoped, the answer was satisfactory, he would then ask leave to withdraw the amendment and not move any of the others.

The Earl of Munster, for the Government, said that the amendments on the order paper fell into two groups. The first group, consisting of detailed amendments relating to the provisions of the Bill, had appeared in substance at one or other stage of the Bill in the House of Commons or during the debates on the Bill last session. The majority of them were withdrawn or had already been rejected by their Lordships or the House of Commons. The second group consisted of new clauses which sought to make specific alterations in the 1926 Act. In the view of the Government those clauses were outside the scope of this Bill and, in any case, could not be accepted.

He understood, however, that since Lord Mount Temple tabled the amendments, the Incorporated Association of Electrical Power Companies, on whose behalf they were prepared, had sought an interview with the Central Electricity Board and the Board had reason to believe that the Association was now satisfied that all its legitimate objections were sufficiently met by the amendments already accepted by the Government and the assurances previously given by the Board and the National Consultative Committee. The Association was satisfied that there would be discussion of the procedure to be adopted for ensuring full co-operation between the Board and the owners of the selected stations in the negotiations for a railway traction supply. At the same interview the Association laid stress on its anxiety to obtain the amendments of the Act of 1926 represented by the new clauses.

For over twelve months the problem had been under discussion between the Board and one of its district consultative committees, and, further, the findings of the committee had been referred to the National Consultative Committee for consideration. The Board had informed the power companies of these facts and of its opinion that the problem could not be solved on the lines suggested by the Association. The Board hoped that all interests concerned could agree to a solution of the difficulty.

Lord Gainford had an amendment on the order paper, but in view of the arrangement that had been made he said he did not propose to move it.

Lord Mount Temple said that those for whom he spoke had not got all that they would like, but the Government had advanced substantially towards a solution of the injustices that would have been suffered if the declaration had not been made. On the important question of railway electrification the promise to consult with all selected stations would largely remove the fear which had existed that the Central Board wanted to cut the distributors out of the business. The declaration made on behalf of the Government would safeguard the interests of the distributors.

The amendment was withdrawn, and the Bill passed through Committee and was reported to the House without amendment.

The Bill was read a third time and received the Royal Assent on Tuesday last.

Pylons in Rural Areas

On February 6th Brig.-Gen. Clifton Brown asked the Minister of Transport whether he was aware that in many parts of rural England which had been disfigured by electricity pylons the local undertakers refused to supply villages and farms with electricity, and that the Wokingham Rural District Council had repeatedly called the attention of the Thames Valley Electric Supply Co. to the necessity for a continuation cable to Hurst village and neighbourhood without avail; and whether he would take steps to cancel the powers given to all those local electricity undertakers who showed no enterprise in developing country districts.

Mr. Hore-Belisha said that he was informed by the Electricity Commissioners that a supply of electricity was actually made available by the Thames Valley Electric Supply Co., Ltd., in the village of Hurst in February, 1932, and in other parts of the parish in the summer of 1933. If he was informed of the particular cases in the parish where difficulty was experienced in obtaining a supply he would make further inquiries. With regard to the latter part of the question he was always ready to have examination made of any cases where there was ground for thinking that undertakers were failing to make reasonable development and he would be glad if Brig.-Gen. Clifton Brown would communicate to him any cases which he had in mind.

In the Courts

ON February 6th Mr. S. R. C. Bosanquet, K.C., the Official Referee, delivered judgment in the action brought by the Highfield Electrical Co., Ltd., of Coventry, claiming £291 the balance of the price of seven dynamos and regulators for the lighting and starting of London Passenger Transport Board buses, the defendant being Mr. A. J. Salisbury, a supplier of electrical equipment, Grosvenor Gardens, S.W. The defence was that the machines were so defective in design and construction that they were rejected by the Transport Board, and the defendant counterclaimed for £700 besides damages for loss of profit on rejected orders.

The plaintiffs, in reply to the defence and counterclaim, said that they carried out the order of the defendant to instructions and that the machines complied with the order.

The Official Referee held that the defendant had shown that he relied on the plaintiffs' skill and judgment as the defendant was not a skilled electrician and was incapable of designing dynamos and regulators. The goods supplied by the plaintiffs were certainly not fit for the purpose intended, whereas the plaintiffs were under an obligation to supply a suitable machine. In the circumstances he held that the defendant was not liable to the plaintiffs on their claim and was entitled to judgment. The defendant was also entitled to judgment on his counterclaim for £540, the amount he had paid the plaintiffs for the machines, and £335 for loss of profit which, with certain other items he was entitled to recover, amounted in all to £1,004 for which amount the defendant would have judgment with costs.

The Official Referee granted the plaintiffs a stay of execution on terms with a view to an appeal.

The Purchase of a Supply Undertaking

In the Chancery Division on February 7th Mr. Justice Farwell had before him a dispute between the Altrincham Electric Supply, Ltd., and the Sale Urban District Council, the case coming before the Court on a special case stated by the arbitrator, Mr. E. W. Lavington.

The question to be determined was the terms upon which the Council had to pay for the acquisition of that part of the company's electricity undertaking which was within the Council's area. Mr. Lavington held that under Section 58 of the Electric Lighting Order Confirmation Act, 1896, the Council had to pay the company a total of £109,924, and the costs of the arbitration.

Mr. Wrottesley, K.C., for the Sale Council, said that what the Council objected to was having to pay for works plant and land outside its area which were used by the company in connection with the supply to the Council and other areas.

When the hearing was continued on February 8th Mr. Tyldesley Jones, K.C., for the company, supported the award of the arbitrator. He submitted that what the Court had to do was strictly to construe the provisions of the Act of 1926, which laid down that all the local authority could buy was that part of the undertaking which was within its jurisdiction and the price that it had to pay was to be measured by the total capital expenditure by the company on its whole undertaking whether inside or outside the area.

At the conclusion of the arguments on February 12th, his Lordship, in giving judgment, said the only question for the Court was to ascertain the true meaning of the language used in the Electric Lighting Order of 1896. The result might be to inflict hardship, but the Court was not concerned with that. In his opinion the language used was clear and unambiguous. The word "undertaking" could only mean the whole undertaking and he could see no justification for holding that they meant that part of the undertaking which it was proposed to purchase.

He was not concerned with the fact that it might be a good bargain for the company as Timperley (where the supply of the company was also being used) might have to pay on the same basis when they purchased the supply in their district. He came to the conclusion that the arbitrator was right and that his award must stand.

Judgment was accordingly entered for the Altrincham Electric Supply Co. with costs.

A Condenser Claim

Sir Francis Newbolt, the Official Referee, gave judgment on February 7th in an action brought by Messrs. Wilkins & Wright, Ltd., Handsworth, against the Rotor Electric, Ltd., London, to recover £135 16s., the balance of the price of radio condensers supplied by the plaintiffs to defendants.

The defence was that the condensers, of which 12,944 were ordered from the plaintiffs, were not fit for the purpose intended and that a great number of them had to be altered. They also counterclaimed for damages. The plaintiffs denied these allegations.

The Official Referee, in delivering judgment, found that the condensers in question had been subjected to rough handling either by the defendants or their customers which resulted in damage. He said there was no proof of deviation from pattern by the plaintiffs or of delay in deliveries. He accordingly gave judgment for the plaintiffs for the amount claimed with costs and also for them on the counterclaim with costs.

L

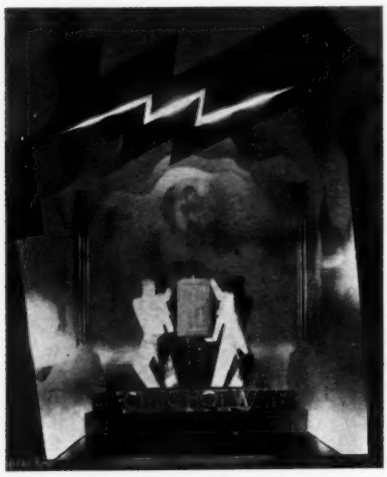
Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments. Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations and Failures

E.D.A. Activities

The British Electrical Development Association has arranged a special window display at the Royal Academy Exhibition of British Art in Industry, Burlington House, Piccadilly, W., from February 4th to 16th. While a single piece of electrical apparatus (an electric water heater) occupies the central position in the window, the entire display has been designed to demonstrate the use of electrical illumination and movement in modern window displays.

The Association has arranged a special display at the Cookery and Food Exhibition which will be held at the Royal Horticultural Hall, Westminster, S.W., from February 25th to March 1st. The stand has been designed by Mr. A. B. Read, and continuous cooking demonstrations by experts are being organised. The principal equipment on the stand will include a water heater, a heavy duty electric range, grill, cooker, two-deck pastry oven, service hot cupboard, mixing machine, automatic toaster, counter set, and a refrigerator.



An E.D.A. window display at the Art in Industry Exhibition

The Sales and Publicity Programme for March again draws attention to the E.D.A. talking films and illustrates publicity matter available to those undertakings which have adopted the scheme. This includes the film "still" display board, posters, handbills, invitation cards, &c. The window display for the month has been designed to emphasise the safety of electric heating. Topical value is given to the display by a representation of a "Belisha" beacon, and the road symbol of the inverted red triangle. The colours are black, white, orange and red. Illustrations of local Press advertising are included, and there are also price lists of special E.D.A. publications and seasonable literature. The Association has prepared a cloth-bound loose cover in which listeners may keep copies of the *Radio Times*. On the back is the slogan "Radio is one of the many joys of life which depend on Electricity." These covers should prove an excellent form of publicity for circulation to selected consumers.

An Electrode Merger

A merger has taken place between the Electrode Co. of Sheffield, Ltd., and the Acheson Graphite Corporation of New York, resulting in the formation of British Acheson Electrodes, Ltd., which will manufacture and sell both carbon and graphite electrodes as well as graphite powders. The company is capitalised at £150,000, all of which has been paid up. The chairman is Mr. C. W. Kayser, chairman of Kayser Ellison & Co., Ltd., and previously chairman of the Electrode Company of Sheffield, Ltd. The managing director is Mr. A. M. Williamson, who has been associated with Acheson interests for many years in America and Europe, while other members of the board include Mr. A. J. Grant (Thomas Firth & John Brown, Ltd.), and Mr. A. Dunbar (English Steel Corporation, Ltd.). Acheson engineers and manufacturing experts are already in Sheffield and construction and equipment purchases will be commenced at an early date, with the expectation that by the end of the year definite production of graphite will be realised. The amorphous carbon business will also be continued and alterations are being made in the equipment in line with the latest technique. Mr. P. M. Chetwynd Stapylton, formerly manager of the Electrode Company of Sheffield, Ltd., will be in charge of the enlarged facilities at the Wincobank Works, Sheffield, and all of the former staff will be associated with the new enterprise, in collaboration with American experts in the supervision of the process. British Acheson Electrodes, Ltd., has opened administrative and sales offices at Town Hall Chambers, Fargate, Sheffield, 1.

How Electric Irons are Made

To the layman an electric iron is a simple appliance, and even electrical engineers do not always realise how much work and care is represented in its production. To remedy this state of affairs (and incidentally to advertise their product), Premier Electric Heaters, Ltd., have produced a film depicting the manufacture of their irons from start to finish. This is not for the general public but for supply engineers and electrical dealers and is in the miniature form, suitable for exhibiting in quite a small room. It commences with the arrival of the castings for the sole plates and shows the care with which they are examined, and the way in which they are treated to ensure the glass-smooth polish and absolute flatness which are great features of the iron. Then the pressing and treatment of the cases is shown, together with the processes for the other parts, including the accurate drilling and the production and fitting of the screws and terminals and the moulding of the connectors. Assembly and final packing complete the film, which occupies half an hour or so and gives a most instructive insight into the whole routine of manufacturing.

Registered Electrical Contractors

Applications for registration from the following were accepted by the Executive Committee of the National Register of Electrical Installation Contractors at its last meeting:—

Merseyside Electric, Ltd., Liverpool.
Ellis, G. F., Low Fell, Gateshead.
Drury Bros., Liverpool.
Harrison, J., & Co., Halifax.
Ellesmere Port Electrical Co., Ltd., Wirral, Ches.
Blagborough & Hebblethwaite, Southowram, Halifax.

At the same meeting three applications were withdrawn and seven were declined.

Ericsson Employés' Hospital Fund

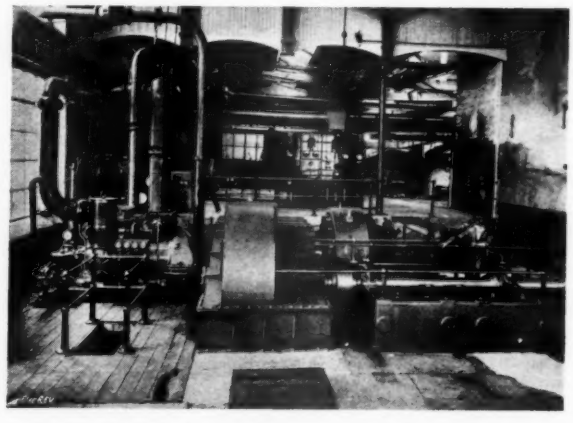
The annual meeting of the Employés' Hospital Fund of Ericsson Telephones, Ltd., was held on February 4th. Mr. J. Engblom, the works manager, presided, and was supported by the trustees, Messrs. Gaskill and Rogers, and members of the committee. Grants totalling £456 were made to various hospitals and institutions, and it was also decided to pay the Nottingham General Hospital a further £450 on account of the Ericsson Bed No. 2 Endowment Fund.

The Iraq Pipe Line

With reference to the notice in our issue of January 25th regarding electrical equipment supplied for the Iraq Pipe Line, W. T. Henley's Telegraph Works Co., Ltd., informs us that since November, 1933, it has supplied 34 miles of "Superite" cable in various sizes and 17¼ miles of other types of rubber-insulated cable, flexible cords, telephone cables and bell wires, all for shipment to the Iraq Petroleum Co., Ltd.

Electric Power for a Paper Mill

One of the latest conversions to electrical operation is that at the Rishton Paper Mills of Messrs. A. M. Peebles & Sons (1927), Ltd., where a turbo-generator has been installed to take the place of a reciprocating engine previously used. The new machine was supplied by the British Thomson-Houston Co., Ltd., and the turbine is of the extraction type with a self-contained surface condenser and auxiliaries. It is rated at 1,250 kW m.c.r., at 6,000 r.p.m., and is coupled through B.T.H. reduction gears of the double-helical double-reduction type to an 850-kW 260-V d.c. generator which runs at a speed of 800 r.p.m. from the first reduction. The second reduction takes up the mechanical drive of the mill through a flexible coupling. The speed of this drive is 110 r.p.m. The turbine is designed to operate with steam at the stop valve at 160 lb. per sq. in. gauge pressure, 650 deg. F. total temperature, and is provided with two extraction points. The first, which is uncontrolled, will normally supply up to a maximum of 2,500 lb.



A view of the B.T.H. 1,250-kW m.c.r. turbo-generator at the Rishton Paper Mills of Messrs. A. M. Peebles & Sons

of steam per hour, but as this tapping point is uncontrolled, the pressure varies with the load. The second extraction point is equipped with B.T.H. standard type automatic extraction valve gear, and the normal pressure is 15 lb. per sq. in. gauge. The normal maximum quantity of steam required for this point is 14,500 lb. per hour. An automatic relay operated pressure reducing valve has been supplied to provide process steam at 15 lb. gauge when necessary should the turbine not be running, and also to provide make-up steam if more is required than the turbine can supply under any conditions of loading. The turbine is provided with cam-operated control gear. The condenser is of the surface type. The circulating water pump is centrifugal and separately motor driven. It is in a pump house approximately 70 yards from the condenser, and its normal speed is 1,440 r.p.m. The driving motor is a 13-b.h.p. machine of the compound wound (shunt characteristic) type. The B.T.H. Co. also supplied motors and control gear for paper-making machines installed in the mill.

The British Industries Fair

The Rapid Magnetting Machine Co., Ltd., informs us that it will have a stand at the British Industries Fair, Birmingham, and will be displaying a comprehensive range of magnetic separators and other apparatus. A number of new developments will also be shown.

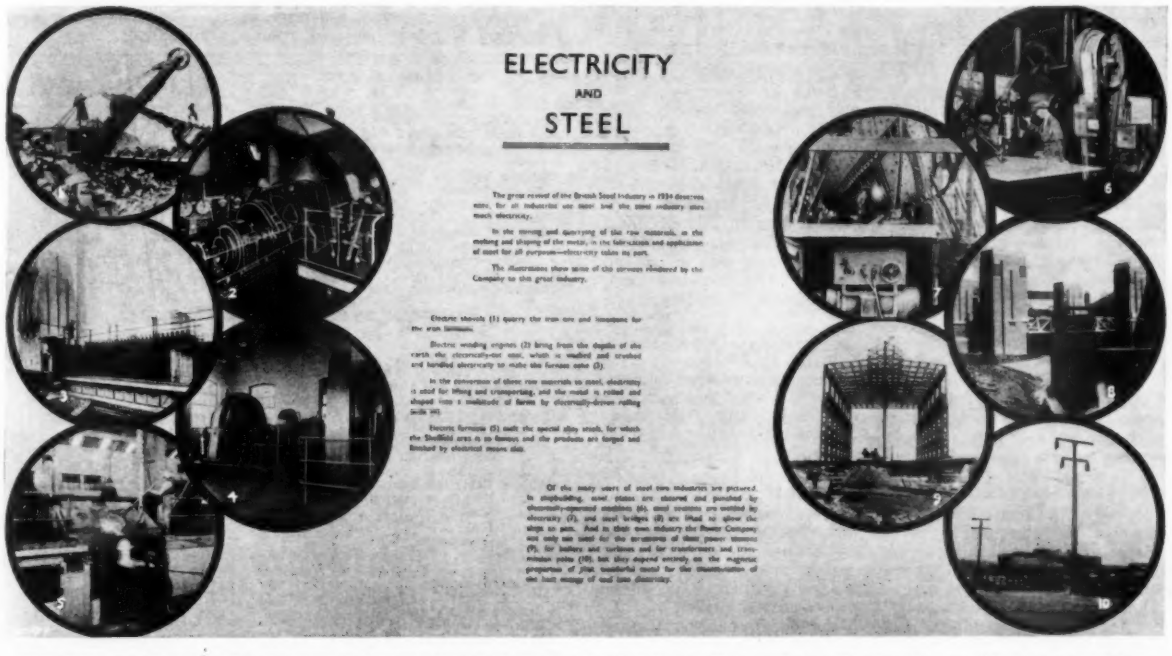
Carron Company will also be again exhibiting in the Birmingham Section of the Fair.

Italian Cable Agreement

An agreement has just been arrived at between the Italian Government and the Societa Italcable under which the latter will receive an annual State contribution of six million lire. On its part, the Italcable will in return hand over to the Government the telegraph cable between Palermo and Cagliari, and the offices, &c., connected therewith, and also all the company's submarine and land telegraph lines and offices in Italy.

Electricity and Steel

In the accompanying illustration we show a broadsheet which has been issued by the Yorkshire Electric Power Co.



Electricity and the steel industry: showing (1) electric shovels; (2) electric winding engines; (3) plant for washing and crushing coal; (4) rolling mills; (5) electric furnaces; (6) machines for shearing and punching steel plates in the shipbuilding industry; (7) welded steel sections; (8) a steel bridge; (9 and 10) plant in the Yorkshire Power Co.'s area

with its report for 1934. The company points out that the revival of the British steel industry in 1934 deserves note, and it therefore illustrates some of the many purposes for which electricity is used in this industry.

Electrical Commercial Travellers

The tenth annual dinner of the Electrical Trades Commercial Travellers' Association was held on Friday last at the Connaught Rooms, London, W.C. Mr. E. A. Joyce, the chairman of the Association, who presided, referring to the absence of Mr. Max Falk, the president, who was to have been the principal speaker, said Mr. Falk had sent a message regretting his enforced non-attendance through indisposition, and wishing the Association continued success. Mr. Joyce, who was chairman of the Association in its first year, said that the first two years had been rather dull, but steady work had been done, and members now found the Association very useful when they wanted its help. He outlined its aims, and referred particularly to its charities. The members of the Association, he said, were representatives of a great industry of which they were proud, and they should do their utmost to make the Association worthy of the industry. Mr. J. W. Heather, a vice-president, paid a tribute to Mr. Falk. He urged that the members should not merely regard themselves as men selling something to earn a living, but as men engaged in building up one of the finest industries in the world. The toast of the "Association and its Charities" was proposed by Mr. E. E. Sharp, chairman of the E.I.B.A., who said that he understood the membership of their Association was 220. He considered that this number was ridiculously small when one considered the number of travellers who were on the road, and it was up to employers and the members to get other travellers into the Association; its membership should easily be ten times as large. He referred to the Association's charities, particularly to its contributions to the E.I.B.A., and thanked the members for their generous support of the latter. Mr. S. Johnson, the charity steward, made an appeal, as the result of which over £27 was collected during the evening. Mr. H. Manning (past chairman) proposed the visitors and the Press, Mr. J. Paynter, secretary of the Commercial Travellers' Schools, responding, and Mr. P. N. King (immediate past chairman) proposed the chairman and officers, to which Mr. Joyce replied. The speeches were interspersed with musical and other items, one of the entertainers being Mr. E. Gill, an expert card manipulator, who is a member of the Association.

The Ex-British Westinghouse Association

The sixteenth re-union dinner of this Association is to be held at the Trocadero, London, W., on March 15th, when Mr. A. P. M. Fleming, C.B.E., will preside.

Recent Contracts

Among the orders which the British Thomson-Houston Co., Ltd., has recently received for large generating plant are one 75,000-kW turbo-alternator for installation in the Barking "B" power station of the County of London Electric Supply Co., Ltd., the third set ordered from the B.T.H. Co. for this station, a 50,000-kW turbo-alternator for installation in the Kearsley power station for the Lancashire Electric Power Co., the alternator being wound for 33,000 V, and a 30,000-kW turbo-alternator for Messrs. Balfour Beatty & Co., Ltd., for the Spondon power station of the Derby and Notts Electric Power Co. All these machines will be manufactured at Rugby. The consulting engineers for the new plant at Barking are Messrs. Merz and McLellan.

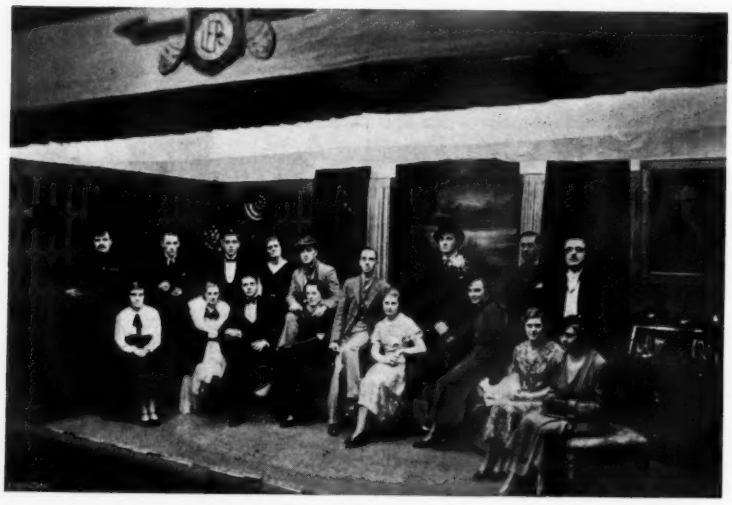
Messrs. Balfour Beatty & Co., Ltd., have been awarded the contract, valued at over a million pounds, for the provision of a dam across the Tigris at Kut. A great deal of the machinery will be electrically driven and the Macintosh Cable Co., Ltd., has received orders to provide the cables for the scheme. The trailing cables feeding the portable electrical machinery will be "Maconite" insulated and sheathed.

The English Electric Co., Ltd., has been awarded a contract by the Portsmouth Corporation for twelve double-deck top covered all-metal bus bodies. The bodies will be designed so as to be suitable for mounting on a two axle forward control chassis and will be provided with vestibule rear entrances. The total seating capacity will be for fifty passengers.

International Combustion, Ltd., has recently received orders for three boilers, p.f. fired, for the Western Australian Govern-

ment Tramways and Electricity Supply for East Perth power station; ash-handling plant for Stourport power station; air heater, fans and ducting for the South African Torbanite Mining and Refining Co.; four mild steel chutes for Stuart Street power station, Manchester; and mechanical parts for four stokers for the North-Eastern Electric Supply Co.

The Brush Electrical Engineering Co., Ltd., has received a repeat order from the Blue Star Line for a further six 300 b.h.p. opposed 4-cylinder type Brush Diesel oil engines. These are to be used in new Blue Star vessels for driving CO_2 refrigeration compressors which will be supplied by Messrs. J. & E. Hall, Ltd.



Members of the Lancashire Electric Power Co.'s staff in "Leave It To Psmith"

Birmingham Electrical Contractors' Dinner

The annual dinner of the Birmingham branch of the Electrical Contractors' Association was held on February 1st at the Imperial Hotel, Birmingham, and was well attended. Mr. H. Marryat (president of the Association) said he was proud of the outstanding loyalty of the members. The toast of "The Industry" was proposed by Lt.-Commander A. E. Neale, Area Officer of E.D.A., who appealed for increased co-operation in the industry, and said that the National Electrical Convention to be held this year, which originated in Birmingham, was the first step towards this ideal of co-operation. Mr. R. H. Rawll (South Midland Centre, I.E.E.) said it was all to the good that the industry should "push" the domestic load, but due regard must also be paid to the maintenance of the industrial side.

Electricity Concessions in Uganda

The Government of Uganda is prepared to receive applications for licences to supply electricity in Jinja, Kampala and Entebbe. Applications must be submitted to the Chief Secretary, Entebbe, Uganda, by July 15th next. Full particulars appear in our classified advertisements.

Trade Announcements

Messrs. L. Benn & Co., Ltd., have removed to 80, City Road, E.C., where they have a showroom in which are displayed the latest designs in lighting fittings for domestic and commercial use. They have also established a trade counter for the sale of electrical accessories and "Tornado" products. Their new telephone numbers are Clerkenwell 5112-3.

The telephone number of the Croydon branch of Messrs. Brown Bros., Ltd., has been changed to Croydon 4411.

Messrs. A. E. Southgate, Ltd., have removed to larger premises at 39, Vyse Street, Birmingham, 18 (telephone: Northern 2836).

Messrs. Partridge & Mee, Ltd., have closed their London office and all communications should now be addressed to Aylestone Park, Leicester.

Messrs. W. R. White & Co. have moved to larger premises at 22, Bruton Street, Berkeley Square, W.1, where they have equipped a showroom to demonstrate the use of the "Whiteway" system of lighting for pictures and tapestries. The telephone number is Mayfair 2676.

Social Events

The Supaul Social Club of Superlamp, Ltd., held its first annual dance at Cannon Street Hotel on February 2nd. Directors, staff and trade friends, numbering about 350, spent a pleasant evening, and it is hoped that the dance will be the forerunner of a series of similar social functions.

Electrical friends from many parts of the country were the guests of Santon, Ltd., at a dinner at the Westgate Hotel, Newport, on January 25th. The dinner was presided over by Mr. H. C. Sanders and Mr. C. W. Buckley (joint managing directors) and was followed by a dance. Amongst the speakers were Messrs. F. C. Davies, A. G. Webb (Principal of the Technical College), J. L. Brown (Birmingham), E. J. Dowson (Area Officer, B.E.D.A.), and A. W. Woodburn (director, Santon, Ltd.). A large number of those who attended paid a visit to the works of Santon, Ltd., on the following day.

The accompanying illustration shows the cast of "Leave It To Psmith," which was recently presented by members of the staff of the Lancashire Electric Power Co. This was a private performance and, although it represented the first piece of amateur dramatic work undertaken by the staff, the acting reached a high standard.

Trade Opportunities in Mexico

The Mexican Government publishes monthly or fortnightly, under the auspices of the Ministry of External Affairs, a bulletin of which about forty pages are devoted to articles written by Mexican consular officers abroad, dealing with machinery, &c., which is likely to be of interest to Mexican industry. A copy of the Commercial Bulletin is available for loan on application to the Department of Overseas Trade, 35, Old Queen Street, S.W.1, (reference D.O.T. 27766/34).

Colour Lighting

"Colour Lighting as an Applied Art" was the title of the lecture given by Mr. R. Gillespie Williams, chief colour engineer of Holophane, Ltd., at the lecture theatre, Church of England Institute, Newcastle-on-Tyne, on January 31st. The Development Association, and Mr. Pike, of the North Eastern Electric Supply Co., was in the chair.

E.D.A. and the Jubilee

It is announced in the current issue of the *Bulletin* that E.D.A. is preparing schemes for special window and other displays in connection with the Jubilee.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances.

CHEMICALS, ETC.	Price, February 13th.	Fortnight's Inc. or Dec.
a Acid, Oxalic ... ... per cwt.	50s.	—
a Ammoniac, Sal ... ... per ton	£40	—
a Ammonia, Muriate (large crystal) ... ,,	£38	—
a Borax ... ... ,,	£17	—
a Copper, Sulphate ... ... ,,	£19 15s.	—
a Potash, Chlorate ... ... per lb.	3¾d. to 4¼d.	—
a ,, Perchlorate ... ... ,,	6d.	—
a Shellac T.N. ... ... per cwt.	£4 18s.	—
a Sulphur Commercial... ... ... per ton	£11	—
a ,, Roll ... ... ,,	£11	—
a Soda Chlorate ... ... per lb.	3¼d. to 3¾d.	—
a ,, Crystals... ... ... per ton	£5 to £5 5s.	—
a Sodium Bichromate, casks ... ... per lb.	4d. net.	—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£100 to £105	—
b ,, Wire ... ... per lb.	1/1 to 1/9	—
b ,, Sheet and Foil... ... ,,	1/2 to 2/9	—
p Babbits Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£209	£1 inc.
Grade II ... ... ,,	£143	—
Grade III ... ... ,,	£70	—
c Brass (rolled metal 2" to 12" basis)... per lb.	6¼d.	—
c ,, Tubes (solid drawn) ... ... ,,	9¼d. to 9d.	—
c ,, Wire, basis ... ... ,,	7d.	—
c Copper Tubes (solid drawn)... ... ,,	9¼d.	—
g ,, Bars (best selected)... ... per ton	£58	—
g ,, Sheet ... ... ,,		
g ,, Rod ... ... ,,		
d ,, (Electrolytic) Bars ... ... ,,	£30 10s.	£1 15s. dec.
d ,, ,, Wire Rods ... ... ,,	£34 15s.	£1 5s. dec.
d ,, ,, H.C. Wire ... per lb.	6¼d.	¼d. dec.
f Ebonite Rod ... ... ,,	1/6 to 2/—plus	—
,, Sheet ... ... ,,	1/3 to 1/6—10%	—
n German Silver Wire ... ... ,,	2/5	—
h Gutta-percha, fine ... ... ,,	nom.	—
h India-rubber, Para-fine ... ... ,,	4¼d.	—
i Iron, Pig (Cleveland No. 3)... ... per ton	62/6	—
i ,, Wire galv. No. 1, P.O. qual. ... ,,	£20	—
g Lead, English Pig ... ... ,,	£12 10s.	—
g Mercury ... ... per bot.	£11 15s.	—
c Mica (in original cases) small ... per lb.	6d. to 1/-	—
e ,, ,, medium ... ,,	5/- to 10/-	—
e ,, ,, large ... ,,	10/6 to 17/6 & up	—
p Phosphor Bronze, plain castings ... ,,	1/1	—
p ,, ,, drawn bars & rods ,,	10¾d.	—
p ,, ,, rolled strip & sheet ,,	10¾d.	—
p ,, ,, wire ... ... ,,	11¼d.	—
o Platinum ... ... per oz.	£7	—
d Silicum Bronze Wire ... ... per lb.	7⅞d.	—
r Steel, magnet, in bars ... ... ,,	7¼d.	—
g Tin, Block (English)... ... ... per ton	£229/7/6 to £231/7/6	£3 7s. 6d. dec.
n ,, Wire, Nos. 1 to 16 ... ... per lb.	3/8	—

Quotations supplied by :—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons
f India-Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g "The Metal Bulletin."
h Edward Till & Co.
i Bolling & Lowe.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.
r W. F. Dennis & Co.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicium bronze wire, lead and rubber, up to the time of going to press, are given in our "Business Notes" under the same heading.

A "Bakelite" Film

The truth of the slogan, "The Material of Infinite Uses," was admirably demonstrated in the sound film which Bakelite, Ltd., exhibited at Bush House last Tuesday. The film illustrated the manufacturing processes involved in the production of the powder with a clarity that is not always the case in this type of film. After this the audience was shown the applications of this powder in the manufacture of a large number of finished goods in considerable variety. Some of these "shots" were taken at the works of Messrs. Thos. De La Rue & Co., Ltd., Ericsson Telephones, Ltd., General Electric Co., Ltd., and Moulded Products, Ltd. There was real merit in the production of the film, almost every action of the various manufacturing processes being photographed in such a way that the audience could follow easily the progress of the material and the commentator was clear both in diction and in his explanations. The educational value of the film makes it admirably suitable for showing in technical schools and to societies, for which purpose it will be available after March 5th.

Callender's Hospital Fund

The general meeting of Callender's Hospital Fund was held on February 2nd at the Belvedere Works, Mr. T. O. Callender taking the chair. The year under review, although not a record one from the financial standpoint, was very successful. The ordinary income was a little lower than in the previous year, but after meeting the various demands for assistance from members in straitened circumstances, a sum of £690 was paid to hospitals and kindred institutions.

Municipal Trading at Marlborough

Marlborough Town Council last week approved a recommendation that, in future, no private extensions or installations to existing installations could be carried out by the Council's staff, except work already on hand or undertaken. An amendment that the Council should empower the electricity staff to carry out works, repairs and replacements, and to supply or hire out goods which the Committee thought to be to the advantage and general growth of the undertaking was defeated.

Changes of Name

The name of the Steyning Electric Light Co., Ltd., has been changed to Steyning Electricity, Ltd., and the Burgess Hill and District Electric Supply Co., Ltd., has changed its name to Burgess Hill Electricity, Ltd.

New Catalogues and Lists

W. T. Henley's Telegraph Works Co., Ltd., Holborn Viaduct, E.C.1.—A brochure on overground disconnecting boxes, partially in a humorous vein.

Philips Lamps, Ltd., 145, Charing Cross Road, W.C.2.—A copy of the public address bulletin.

B.E.N. Patents, Ltd., Gorst Road, Park Royal, N.W.10.—Particulars of the new "Instantair" valve coupling.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—A brochure on draw-out pillar-type switchgear, classes "E" and "F."

H. J. Scott & Co. (Belfast), Ltd., Volt Works, Ravenhill Avenue, Belfast.—A price list of motors.

Marconi's Wireless Telegraph Co., Ltd., Electra House, Victoria Embankment, W.C.2.—A booklet on Marconi equipment for police services.

Newman, Hender & Co., Ltd., Woodchester, Glos.—A booklet on Newman-Milliken valves.

British Insulated Cables, Ltd., Prescot.—Catalogues of trolley wire, "Rockbestos" a.v.c. cables, and condensers for neon signs.

Bulpitt & Sons, Ltd., Swansea Works, Swansea.—Particulars of the "Swan" electric booster.

Hanovia, Ltd., Slough.—A pamphlet on the "Homesun" lamp.

Drake & Gorham, Ltd., 77, Long Acre, W.C.2.—A leaflet describing a telescopic table standard.

Berkeley & Young, Ltd., Tyseley, Birmingham, 11.—A leaflet on the "Sunsette" fire.

Bankruptcy Proceedings

F. E. Saunders, electrical and mechanical engineer, 3, Moorcroft Road, Streatham, and 10a, Page Street, Westminster, S.W. —An application was made on February 5th to Mr. Registrar Mellor at the London Bankruptcy Court for an order of discharge on behalf of this bankrupt, who failed in September, 1931. The Official Receiver reported that the ranking liabilities amounted to £1,652, whilst the assets, although valued at £668, had realised only £51. The discharge was suspended for four months.

Pentonville Radio, radio dealers, 269, Pentonville Road, N.— The statutory first meeting of creditors under this failure was held on February 6th at Carey Street, W.C. No statement of affairs was submitted and it appeared that as yet no debtor had attended for preliminary examination. The receiving order was made on January 24th on the petition of the General Electric Co., Ltd., creditors for £52, the act of bankruptcy alleged being the non-compliance of the debtors with the requirements of a statutory bankruptcy notice. As a result of the meeting, which was closed, the affairs of the debtors remained in the hands of the Official Receiver.

W. J. Davies, 230, Great North Road, Woodlands, near Doncaster, radio and electrical engineer.—The public examination herein was closed recently at the County Court Hill, Bank Street, Sheffield. According to the statement of affairs filed there were unsecured liabilities of £393, with a deficiency of 14s.

T. Ward, radio and battery engineer, 7B, Richmond Street, Bridlington.—Trustee, Mr. J. S. Snowball, Bank Chambers, Scarborough, Official Receiver, released January 29th.

A. Leach, radio dealer, 4, Market Street, Otley.—First and final dividend of 1s. in the £, payable February 20th, at 24, Bond Street, Leeds.

H. Gallie, wireless accessory dealer, Tidworth Market, Tidworth.—Receiving order made January 31st on debtor's own petition. Public examination March 7th at the Guildhall, Salisbury.

E. Howitt (Howard & Co.), wireless dealer, 368, South Road, Walkley, Sheffield.—Public examination February 21st at the County Court Hall, Bank Street, Sheffield.

J. Ackroyd, electrician, 2, Dawlish Terrace, Leeds.—Receiving order made January 31st on debtor's own petition.

C. S. Ellis, electrician and wireless dealer, 11, Kay Street, Darwen.—Trustee, Mr. J. W. Carter, District Bank Chambers, Blackburn, Official Receiver, released February 4th.

I. L. Lawrence, electrician, 11, Grand Parade, Brighton.— Trustee, Mr. V. R. Fletcher, 8, Old Steine, Brighton, Official Receiver, released February 4th.

W. S. Fray (R. E. Warren), electrician, 1, Albert Road, Torquay.—Trustee, Mr. W. R. Cocks, Exeter Bank Chambers, Broadgate, Exeter, Official Receiver, released February 4th.

H. Barker (Broadway Radio Stores), 848, Manchester Road, Bradford.—Last day for receiving proofs for dividend February 23rd. Trustee, Mr. J. O. Morris, 71, Manningham Lane, Bradford, Official Receiver.

Company Liquidations

Plew Television, Ltd., Stafford Road, Waddon, Surrey.—The report of the Official Receiver and liquidator upon the failure of this company states that the liabilities as at October 8th, 1934, when a receiver for the debenture holders was appointed, were £6,683, of which £6,308 was expected to rank for dividend purposes; the assets, valued at £364, are absorbed in the preferential and debenture claims, and the deficiency as regards contri- of 8 per cent. ordinary shares of £1 each. On October 8th, 1934, Mr. Henry Lewis Ward was appointed receiver for the debenture holder. He has sold the company's stock and plant for £322, but does not anticipate realising sufficient to discharge the preferential and debenture claims in full. Mr. Norris attributes the failure of the company to lack of initial capital, incompetency of the works management, and to the position created in the radio trade, which prejudiced sale of the company's products.

Radio Components, Ltd., 527-533, Harrow Road, W.—The statutory first meetings of creditors and shareholders under the compulsory liquidation of this company were held on February 8th at the Board of Trade Offices, Carey Street, W.C. Mr. H. P. Naunton, Assistant Official Receiver, reported that the winding-up order was made on January 21st upon the petition of Theodor Kolb, who was the managing director and was also an unsecured creditor for £2,000 in respect of cash advances. The liabilities were estimated at about £5,000 and the assets were expected to realise £900 at a forced sale. A resolution was passed for Mr. M. G. Hacker, accountant, to act as liquidator, with a committee of inspection consisting of five creditors.

Pemberton & Sturgess, Ltd., electrical engineers, 14, Gloucester Road, S.W.7.—The statutory meeting of creditors of the above was held recently at Balfour House, Finsbury Pavement, E.C., when a statement of affairs was submitted which showed liabilities of £4,987, of which £2,164 was rue to the trade; expense creditors totalled £195, rent amounted to £75, loans accounts for £1,796; there was a bank overdraft of £299, and Mrs. Sturgess was a creditor for £457. The net assets amounted to £1,178, leaving a deficiency of £3,809. The creditors passed a resolution appointing Mr. W. A. J. Osborne liquidator of the company with a committee of inspection consisting of the representatives of five of the creditors.

Trojan (Manchester), Ltd., Alexandra Road, Manchester, electrical contractors, &c.—The creditors of this company met recently in Manchester, when Mr. H. G. Jenkinson, one of the directors, occupied the chair. A statement of affairs was submitted which showed ranking liabilities of £8,605. The net assets were £3,332, leaving a deficiency, so far as the creditors were concerned, of £5,273. It was reported that the company was registered in July, 1929, taking over an existing business which had previously been carried on in partnership. The nominal capital was £8,000, of which £5,750 was fully paid. It was decided that the voluntary liquidation of the company should be continued with Mr. W. S. Berry, of Messrs. A. G. Deakin & Co., Manchester, as liquidator, together with a committee.

John H. Wilson & Co. (1929), Ltd.—Particulars of claims by February 28th to the liquidator, Mr. S. Colvin, 6, Castle Street, Liverpool.

Pemberton & Sturgess, Ltd.—Winding up voluntarily. Liquidator, Mr. W. A. J. Osborne, Balfour House, Finsbury Pavement, E.C.

Private Arrangements

Mrs. S. Barnard, trading as Philip Barnard & Co., 42, Maiden Lane, Southampton Street, Strand, W.C.2, wireless and electrical factor.—A meeting of creditors in this matter was held recently at the above address, when Mr. H. Lever presided. A statement of affairs was submitted which disclosed liabilities of £890, of which £627 was due to the trade; there were loan creditors for £217, and sundry creditors' claims amounted to £46. The net assets were £123, leaving a deficiency of £767. It was decided that the matter should be dealt with under the deed of assignment already executed to Mr. H. Lever as trustee.

A. S. Markes, trading as A. S. Markes & Co., late of 17, Percy Street, Tottenham Court Road, W.1, electrical factor.—A meeting of creditors herein was held on January 31st, when a statement of affairs was submitted, showing liabilities of £702. The assets totalled £200, leaving a deficiency of £502. It was decided that a deed of assignment should be executed in favour of Mr. Samuel as trustee, with a committee of inspection.

Dissolution of Partnership

Western Wireless, wireless dealers and electrical engineers, 33, Fisherton Street, Salisbury.—Messrs. H. Cooke and R. F. Jenking have dissolved partnership. Mr. Cooke will attend to debts and carry on the business.

Electricity Supply

Lighting, Domestic, Power

Ash (Surrey).—STREET-LIGHTING POLL.—Although there were 856 votes against 56 in favour of the adoption of street lighting, as the requisite 50 per cent. of the 2,300 electors did not attend the poll it was accordingly declared void.

Ashton-in-Makerfield.—EXTENSIONS.—The Urban District Council is to extend the l.v. cable to Bryn Gates at a cost of £600, and an extension to Garswood has been approved in principle, although the carrying out of the scheme has been deferred.

Barnoldswick.—ELECTRICITY CHARGES.—As from April 1st the following revised "unit" charges under the rateable-value tariff will be introduced: Summer quarters, ½d. per kWh; winter quarters, 1d. per kWh for first 50 kWh, ½d. for next 50 kWh, and ¼d. above 100 kWh.

Battle.—SUPPLY TO BODIAM.—Negotiations are proceeding between the Rural District Council and the Weald Electricity Supply Co., Ltd., with the object of securing a supply of electricity for Bodiam.

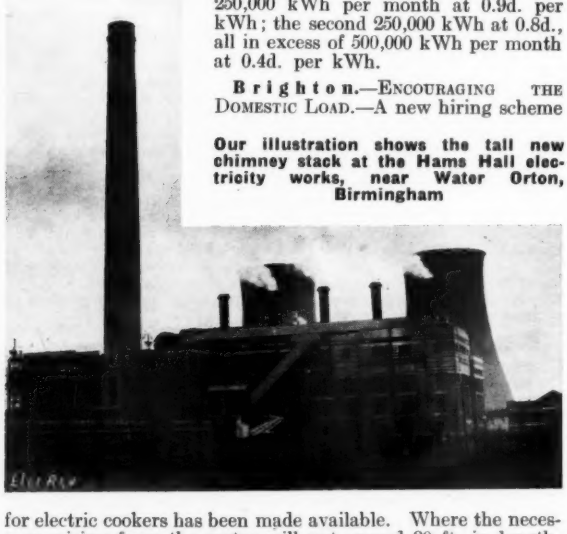
Beauly.—OVERHEAD LINE.—Work has commenced on the erection of a new overhead line to Beauly from the Ross-shire Electric Supply Co.'s hydro-electric station at Loch-luichart, a distance of fifteen miles. The line is being carried by steel towers.

Beckenham.—SUB-STATION.—The Electricity Committee recommends the provision of a new sub-station costing, with extensions to cables, £4,396.

Billington-upon-Tees.—ELECTRIC STREET LIGHTING.—The Council proposes to change all street lighting in the town from gas to electricity.

Bolton.—A FALL IN OUTPUT.—At a recent Town Council meeting Councillor Simpson referred to a decrease of 209,900 kWh (2.34 per cent.) in the amount of electricity generated during December. Discontent, he said, existed among industrial consumers. One firm proposed generating its own energy, and on a 100,000-spindle mill would save £2,500 to £3,000 a year. In another instance the cost of running a loom by electricity was three times the cost of steam. The Electricity Committee, he continued, should give a flat rate to all industries taking a steady load in the day time. The systems now in operation were inequitable. Councillor Winkley attributed the decline to trade depression and mild weather. A conference between electrical engineers and textile representatives had been held in Manchester, he said, and engineers were awaiting for the trade delegates to prove some of their statements.

TRACTION TARIFF.—The following revised tariff for the supply of electricity for traction purposes has been recommended by the Electricity Committee: The first 250,000 kWh per month at 0.9d. per kWh; the second 250,000 kWh at 0.8d., all in excess of 500,000 kWh per month at 0.4d. per kWh.



Our illustration shows the tall new chimney stack at the Hams Hall electricity works, near Water Orton, Birmingham

Brighton.—ENCOURAGING THE DOMESTIC LOAD.—A new hiring scheme for electric cookers has been made available. Where the necessary wiring from the meter will not exceed 30 ft. in length, the undertaking will install and connect a "de luxe" cooker with vitreous enamel finish for a nominal fee of 5s. Included with each cooker is a fast-boiling electric kettle of four pints capacity. A ten-gallon electric wash-boiler may be added if desired. Electricity for this equipment will be supplied through a prepayment meter at 1d. per kWh, including all hiring charges.

Bristol.—A LARGE LOAN.—Sanction to borrow £200,000 for expenditure on mains is being sought by the Electricity Committee.

Buckhaven (Fife).—ELECTRICITY FOR COUNCIL HOUSES.—Electrical installations are to be provided on future housing estates, according to a decision of the Town Council.

Canterbury.—SUPPLY AGREEMENT.—A five-year agreement has been entered into by the City Council with the Kent Power Co., Ltd., for a supply of electricity at 4½d. per kWh to the new housing estate at Thanington, which is outside the city.

Colchester.—DISTRIBUTION SCHEMES.—Schemes of l.v. distribution have been decided upon by the Electricity Supply Committee as follows: Marks Tey, £50; Frating, £245; Tiptree, £69. The e.h.v. line at Jaywick is to be extended and a second transformer provided at a cost of £390, and works for improving the present supply and catering for new consumers at Stanway Green and Villa Road are to be undertaken at a cost of £1,348.

Coulsdon and Purley.—STREET LIGHTING.—The Urban District Council has decided, as briefly mentioned in our issue of February 1st, after a twelve months' comparative test in the main Brighton Road, to change over the whole of its seventy-three miles of public highways from gas to electric lighting, and it is entering into a contract with the County of London Electric Supply Co., Ltd., for the electricity supply for this purpose.

Darlington.—MAINS AND SERVICES.—The Town Council has received sanction to a loan of £41,000 for electricity mains, services and meters.

Dumfries.—DEMAND FROM OUTSIDE AREAS.—A recommendation by the Electricity Committee that application should be made to the Electricity Commissioners with a view to securing a general order for granting supplies of electricity to areas outside the burgh has been approved. There have been many requests for electricity from outside the burgh, and the Committee desired a "fringe" scheme which would allow them to supply outside consumers without delay.

East Grinstead.—LOWER TARIFF.—Substantial reductions in the electricity tariffs have been approved by the Urban District Council, we are informed by Mr. J. B. Morgan, electrical engineer and manager. The lighting rate is to be reduced by 1d. to 6½d. per kWh, and there is to be a special 25 per cent. discount to consumers of over 5,000 kWh per quarter. A reduction of 10s. per kVA in the domestic kVA tariff and in the standard charge per room from 3s. 6d. to 3s. is also recommended. If a cooker is installed a ¼d. per kWh reduction is proposed; if a water heater is installed as well there is to be a reduction of ½d. per kWh. On the shop kVA tariff the Committee proposes a reduction of £4 per kVA, from £20 to £16. A new cooking tariff with a flat rate of 1d. per kWh, and the abolition of all meter rents, are also proposed.

Glasgow.—CABLES.—More than seventeen miles of electric cable have had to be laid, at a cost of £17,000, in order that the Lennox Castle Estate may have electric lighting. It is being converted into a mental hospital by the Glasgow Public Assistance Committee. Derby Cables, Ltd., secured the contract for the underground cable work, and the installation has just been completed under the direction of Mr. J. Campbell Murray, the consulting engineer to the Corporation.

MAINS.—The Electricity Committee is to lay distributing mains at a cost of £18,975.

Guildford.—OVERHEAD LINES.—The Rural District Council has consented to the use of overhead lines at Ash Vale and Wyke by the Mid-Southern Utility Co., Ltd., for the supply of electricity.

Haworth.—TARIFF REDUCTION.—The Urban District Council has reduced the flat rate for electricity from 5d. to 4½d. per kWh as from January 1st.

Headcorn.—ELECTRICITY FOR THE VILLAGE.—The Parish Council has approved the general layout of a scheme submitted by the Weald Electricity Supply Co., Ltd., for supplying electricity to the village. The work will commence early in the summer.

Hull.—AN ELECTRIC FOUNTAIN.—The Electricity Committee has approved in principle a proposal to erect an electric fountain on the Queen's Dock Estate, subject to the fountain being used as an advertisement for the use of electricity.

Huntingdon.—ELECTRICITY FOR INSTITUTIONS.—The County Public Assistance Committee is asking the Beds, Cambs & Hunts Electricity Co. for a flat-rate charge for all electricity consumed by the County Council in its institutions.

Inverness.—FLOOD DAMAGE TO POWER SCHEME.—Many thousand pounds worth of damage has been done by flooding on the Lochaber power scheme in the Loch Laggan district in Inverness-shire. The swollen River Gulbin entered the canal which leads from Loch Laggan to the great dam on the Spean with such force that it filled the canal with gravel and stones and broke the bank on the opposite side. Engineers have had to relay the rail track along the canal and to fetch a steam dredger to clear the channel on which the whole scheme depends for the use of Loch Laggan. At the west end of the loch the River Pattock has sunk deeper in its course as it enters the lowered loch and has begun to undermine the foundations of a road bridge.

Ipswich.—SUB-STATION RECONSTRUCTION.—The Electricity Committee recommends the reconstruction of the Duke Street sub-station and the provision of additional plant and equipment at a total estimated cost of £9,000.

Italy.—PORCELAIN INSULATORS.—The Italian Electrotechnical Committee has recently drawn up a series of proposed standard sizes and methods of test for porcelain electrical insulators.

Kettering.—OVERHEAD EXTENSION.—The Rural District Council has given permission for the erection of an overhead line to Little Weldon.

Lanark.—ELECTRICITY AND COUNCIL HOUSES.—The County Council has refused to withdraw restrictions limiting the introduction and use of electrical energy in county-owned houses. It was complained that tenants of Council houses at present supplied with gas for lighting and heating, who desired at their own cost to install electricity, were prohibited from doing so by the regulations. The Council felt that to prevent the county gas undertaking becoming insolvent it must retain its present consumers.

Leeds.—SUB-STATION EQUIPMENT.—The Electricity Committee is seeking sanction to borrow £30,000 for sub-station equipment.

Liverpool.—AN UNUSUAL OFFER.—At a recent meeting of the Electric Power and Lighting Committee a bailiff offered his services in tracing consumers' apparatus which had been hired out and had been removed by consumers on vacating the premises. The committee decided to make an arrangement on the lines suggested.

SLOT METERS.—The Corporation has offered to install penny-in-the-slot meters at a cost of 3s. 6d. per installation.

London.—BATTERSEA.—The L.C.C. is of the opinion that the consent of the Electricity Commissioners to the installation of three additional boiler units required to complete the first half of the Battersea power station should only be given on conditions similar to those imposed in connection with the extension of the Fulham generating station in 1930; that such consent should be limited strictly to the three units referred to; and that the local authorities concerned should be notified of any proposed further extension of either the generating or boiler plant and be given an opportunity of making representations to the Commissioners.

Malvern.—LOANS.—The Urban District Council has received sanction to loans of £2,000 for sub-stations and equipment and £1,000 for meters.

Manchester.—PROGRESS.—There were 1,452 new consumers during December, and 731 existing consumers applied for additional supplies, representing a total of 3,748 kW. Orders for cookers amounted to 172, for wash-boilers twenty-four and water heaters twenty-seven, bringing the totals on circuit to 14,152, 753 and 823 respectively.

Minchinhampton (Gloucester).—ARRANGEMENTS FOR A SUPPLY.—The 6,600-V lines from Brimscombe and Nailsworth to Minchinhampton will be completed in the next few weeks, and sub-station sites have been obtained. The West Gloucestershire Power Co. states that the extensions now in hand will substantially meet all those requirements which can be economically dealt with.

Motherwell.—CHANGE-OVER.—The Town Council has agreed to the change-over of supply from d.c. to a.c.

ELECTRIC LIGHTING.—An extension of mains for lighting Greenhead housing estate with electricity, at an estimated cost of £260, has been passed. Mossneuk Park lighting has been extended, and Melville Drive lighting is under review. It is suggested that better lighting should be provided in Mill Road at a cost of £120.

Northern Ireland.—LONDONDERRY.—Work is to commence shortly on the erection of a 33-kV overhead line from Derry to Strabane, by which a supply of electricity will be sent from the Corporation's power station. Eventually an overhead line will be carried to Omagh, which will also be supplied from Derry, states the *Irish News*. Omagh will be linked up with Belfast. The Corporation will sell energy to the Electricity Supply Board. It is expected that Strabane will be supplied before the end of June.

Northumberland.—OVERHEAD LINES.—The Ministry of Transport has consented to the North-Eastern Electric Supply Co., Ltd., erecting a l.v. overhead electric network at Burradon and Camperdown. The matter was recently the subject of a public inquiry, when the objectors were the Longbenton Urban District Council.

Peterhead.—A CASE OF ASSESSMENT.—Electricity undertakings are valued on revenue, and on this principle a local electricity concern was entered at £10. The County Assessor, on the contractor's principle (roughly capital cost) wanted £250, while the County Valuation Committee fixed the valuation at £150. An appeal was made to the Lands Valuation Court, Edinburgh, and the Court directed that the figure of £10 should be restored to the roll. Lord Hunter said that for over fifty years the revenue principle of valuation had been applied to public utility companies, and the Court had approved of that method, as was shown by numerous decisions.

Plymouth.—FREE WIRING.—The Electricity Committee has recommended the termination of the "free" wiring system, and also that charges under the assisted-wiring scheme shall be reduced. Under the "free" scheme the consumers pay 1¾d. per kWh extra for the wiring.

Reading.—STREET LIGHTING IMPROVEMENTS.—The Town Council has adopted in principle a scheme costing £34,500 for the use of "Osira" lighting in a number of streets.

RESERVE FUND FOR UNDERTAKING.—A reserve fund for the Corporation electricity undertaking is to be established, a sum of £18,171 being set aside for the purpose.

Reighton (Yorks).—GRID SUPPLY.—Arrangements for providing a supply of electricity from the grid have been practically completed.

Salford.—CHANGE-OVER.—The Electricity Committee is seeking sanction to borrow £60,000 for the change-over of the supply.

Scarborough.—DUPLICATE SUPPLY TO FILEY.—The Town Council has received sanction from the Electricity Commissioners to the borrowing of £6,877 in respect of the scheme for affording a duplicate supply of electricity to Filey.

A combination of electric-discharge lamps and incandescent electric lamps is used to floodlight Superity House, London, W.3, the head office and central stores of United Dairies, Ltd. The equipment consists of six 400-W "Escura" electric-discharge lamps in "Saturn" projectors, and four 1,000-W "Royal Ediswan" lamps in "Mars" projectors. "Neptune" projectors are used for the centre portion of the building and the large milk bottle

Sheffield.—MAINS EXTENSIONS.—The Electricity Committee has authorised mains extensions at a total estimated cost of £8,720.

Shipston-on-Stour.—OVERHEAD LINES.—The Rural District Council has offered no objection to l.v. overhead lines being erected at Tredington by the Shropshire, Worcestershire & Staffordshire Electric Power Co.

Sleaford.—METER RENTS.—At a recent Housing Committee meeting the clerk reported that the assistant district auditor had drawn his attention to the practice of the Council of not charging rents for electricity meters installed in Council houses, thus giving the tenants a preference over other consumers. The committee decided to ask the Electricity Committee to calibrate the meters at 7d. per kWh so as to be in line with the other prepayment consumers. It was also decided that the fixed charge in respect of floor space of Council houses should be on a uniform scale with houses having a similar area.

COMPANY'S OFFER.—A letter to the Electricity Committee from the Mid-Lincs Electric Supply Co., Ltd., stated that the company would shortly be erecting a line to Leasingham and Cranwell, which would run close to Holdingham, and asked whether it would be possible for the company to provide the Council with a bulk supply for Holdingham, or to supply the area under a Fringe Order. The Council has replied that it is at present carrying out extensions to its system to meet the requirements of the housing development at the north end of the town, and pointing out that the extensions will bring the system within 800 yds. of Holdingham, also that the possibility of the Council taking a supply to Holdingham has previously been discussed and that the supply will be extended when the time is opportune.

Southport.—PROMENADE LIGHTING.—The Lighting Committee has recommended the expenditure of £5,000 on street-lighting equipment for promenade lighting.

South Shields.—ILLUMINATIONS.—Authority to spend £2,000 on illuminations in South Shields and £1,500 on "Town's Week" will be sought by the Parks Committee.

Stratford-on-Avon.—OVERHEAD EXTENSIONS.—The Rural District Council has consented to an extension of overhead lines at Welford-on-Avon by the Shropshire, Worcestershire & Staffordshire Electric Power Co.

Spalding.—NEW TARIFFS.—The Urban District Council has reduced the electricity tariffs for the summer quarters from 8d. and 9d. for lighting to 6d. per kWh; from 2d. and 1½d. for domestic purposes to 1d. per kWh, and for water-heating from ¾d. to ½d. per kWh. The "telephone" system is to be as follows: first 150 kWh at 1d. per kWh, 150 to 300 kWh at ¾d., over 300 kWh at ½d. The electrical engineer and manager is Mr. F. R. C. Roberts.

Tenterden.—SUPPLY TO WOODCHURCH.—The Weald Electricity Supply Co., Ltd., has commenced laying an underground cable from Tenterden to Woodchurch.

Tynemouth.—ANNUAL REPORT.—A protest against the high assessment of the electricity undertaking is made by the borough electrical engineer (Mr. Charles Turnbull) in his report for the year ended March 31st, 1934. He declares that the department has had to pay considerably more than the gas company in the area. The report for the year ended March 31st last shows a surplus, after paying all expenses, &c., of £8,809. The total expenditure on capital account amounted to £303,748, but of this £162,340 has been paid off, leaving only £141,408 outstanding. Owing to the closing of Preston colliery, the abandonment of the trams and the trade depression, a demand of about 4,000,000 kWh was lost, but this amount has now been mostly recovered in other directions.

Walsall.—SUPPLY IMPROVEMENTS.—The Corporation is to improve the supply during the next twelve months at a cost of £5,400.

Wokingham. — CHEAPER ELECTRICITY. — The Yorktown (Camberley) & District Gas & Electricity Co. is to reduce its lighting flat rate by 1d. per kWh in March.

Wolverhampton.—TARIFF REDUCTIONS.—The Electricity Committee recommends the following reductions in tariffs: Running charge for e.h.v. bulk-supply consumers to be reduced from 0.275d. to 0.25d. per kWh; running charge for l.v. bulk-supply consumers from 0.375d. to 0.35d.; running charge for rateable value and differential consumers from 0.55d. to 0.5d.; a discount of 10 per cent. to be allowed to power consumers who correct their power factor to 0.95d.; and a reduction of the price per kWh of electricity for street lighting from 1d. to 0.8d.

MAINS EXTENSIONS.—The Electricity Committee is to extend mains at an estimated cost of £4,375.

SUPPLY TO NEW HOUSES.—The Electricity Committee is to provide a supply to houses at Finchfield Lane (£259); Bishops Wood (£695); and to a new estate at the rear of Showell Works, Bushbury (£2,188).

York.—SUB-STATION.—The Electricity Committee is to erect a sub-station near the site of the proposed parochial hall on the Burton Stone estate.

Traction

Belgium.—REGENERATIVE BRAKING ON ELECTRIC TROLLEY-BUSES.—At a recent meeting of the Liège section of the Société Belge des Electriciens M. Charles Harmel, the general manager of the Société des Tramways Unifies de Liège et Extensions, read a paper on the Belgian-built electric trolley-buses now running in Liège and district. He referred to the Houet system of regenerative braking and to the comparative tests which have been carried out. The tests showed, he stated, that with the Houet system the economy in power consumption amounted on level stretches to 18 per cent., and to 26.5 per cent. on hilly sections, without taking into account an economy of over 85 per cent. in brake maintenance.

Bolton.—PROPOSED TRAMWAY ABANDONMENT.—The Town Council has disapproved the recommendation of the Transport Committee that the Crofters to Horwich tramway system should be abolished and buses substituted.

Germany.—STATE RAILWAY ELECTRIFICATION.—Operations are shortly to be commenced on the electrification of the Mering to Weilheim section of the German State Railways which connects Lake Ammer with Augsburg.

Leeds.—NEW TRAMCARS.—There have recently been put into service by the Corporation sixteen eight-wheel tramcars for which the motors and lighting equipment were supplied by the General Electric Co., Ltd. The contracts included the supply of 64 traction motors and over 1,000 "Osram" traction lamps, nearly all of the low-voltage, long series type. Each car is equipped with four "Witton" motors, type W.T.181, which were specially designed for their light weight and for use with small running wheels; in other respects they are standard series-wound motors. The drive is taken through 7½ deg. helical gearing. The motors are wound for half the line voltage, and are permanently connected in pairs in series; each develops 35 h.p. at 550/2 V on the one-hour rating (in accordance with B.S.S. No. 173—1928), giving a total of 140 h.p. per tramcar. For interior lighting (and also for illuminated destination and route indicators) each car is equipped with 56 "Osram" traction lamps, rated at 40 W 40 V, and connected in groups of 14 in series. These lamps incorporate a short-circuiting device which comes into operation immediately any lamp fails, maintaining the circuit through the remaining lamps of the series.

Manchester.—TRAM TRACK ALTERATIONS.—A proposed one-way traffic scheme at St. Peter's Square will necessitate alterations in the tramway track costing £8,000.

Reading.—TROLLEY-BUS BILL.—The Town Council has informed the Thames Valley Traction Co., Ltd., that it is not prepared to alter the Bill now before Parliament to provide for the operation by the Corporation of trolley-buses only within the borough.

Russia.—THE MOSCOW UNDERGROUND.—According to *Reuter*, the first line of the railway has been completed and a test train has made a journey along the entire track. The railway has considerably wider passenger platforms than the London system. A further report states that work on the second line of the subway, to be 22 km. long, will be commenced early in the spring.

Communications

Bulgaria.—NEW TRANSMITTERS.—Two new 2-kW stations at Varna and Stara Zagora and a high-power station at Sofia have been proposed by the Administration of Posts, Telegraphs and Telephones.

Great Britain.—POST OFFICE ACCOUNTS.—A net surplus of £12,308,017, after charging interest on capital, as compared with £11,055,717 for the previous year, is shown in the accounts for the year ended March 31st, 1934. Of this increase the telephone service accounted for nearly £1,000,000, as compared with £409,521 in 1932-3. On the telegraph service there was a deficit of £653,591, which is nearly £200,000 less than in the previous year. The number of telegrams sent increased by 176,000 to 36,217,000, while telephone calls advanced in number from 1,490,284,000 to 1,580,458,000. There are now 1,504 automatic telephone exchanges (total exchanges 5,405).

LICENCES.—There was a net increase of 108,160 in the number of wireless licences in force at the end of January, bringing the total to 6,888,000, which is 764,260 more than a year ago.

Ireland.—WIRELESS TELEPHONY.—Following the success of the ultra-short-wave wireless telephone link between Great Britain and Ireland which was put into operation just before Christmas, the Post Office has decided to extend this service by the addition of a further nine channels, bringing the total number to fifteen. The new nine-channel equipment will differ from the six-channel apparatus at present working. The latter uses a separate transmitter and receiver for each channel, so that in effect it comprises six independent wireless links working side by side. In the new nine-channel system the whole of the nine conversations will be transmitted and received by a single transmitter and receiver. The wavelength which will be adopted for the Britain-Ireland service will accordingly be in the neighbourhood of four meters. The contract for the system has been placed with Standard Telephones & Cables, Ltd.

Japan.—WIRELESS TELEPHONE LINK WITH EUROPE.—*Reuter* reports from Tokio that an experimental talk by direct wireless telephone between Osaka and Berlin was successfully carried out last week, when a representative of the Ministry of Communications spoke to a Japanese professor living in the German capital. A wireless telephone service between England and Japan is shortly to be inaugurated. The cost of calls between London and Tokio, it is expected, will be in the neighbourhood of £2 a minute.

Newcastle.—RECONSTRUCTED B.B.C. BUILDING.—Broadcasting House was formally opened last week after its reconstruction. It now has three studios, control, battery, echo, machine and listening rooms, and administrative offices.

Newfoundland.—BROADCASTING.—According to a *Reuter* message from St. John's the B.B.C. has been invited to send a representative to Newfoundland to discuss with Mr. Harper, chief of the Post Office, and parties interested in wireless, proposals for future broadcasting in that country. Last autumn Mr. O'Halleran took to England draft regulations for broadcasting which it is understood were unacceptable both to the British officials and to Newfoundland interests. The B.B.C. official is expected to arrive in Newfoundland by May or June.

Spain.—BROADCASTING SCHEME.—A *Reuter* message from Madrid states that the Spanish Government has issued an invitation asking for plans and estimates for the erection of ten broadcasting stations in the chief cities. It is intended to reform the methods at present in use under which listeners hear advertisements broadcast so frequently and at such length that many have ceased to use their wireless apparatus.

West Yorkshire.—TELEGRAPH AND TELEPHONE PROGRESS.—The West Yorkshire telegraph and telephone district extends over 1,070 square miles. The annual report for the area, which has just been issued, shows that during 1934 468,662 telegrams and 553,147 phonograms were handed in. The reorganisation of the telegraph instruments rooms at Leeds and Bradford has been completed. At the end of the year the number of telephone stations was 81,362, an increase of 4,306 on the previous year. Three new automatic rural exchanges were opened, bringing the total up to fourteen, while two more are to be reconstructed and provided with automatic equipment. Surveys are being made with a view to providing new underground cables from Leeds to London, Bradford to Halifax, and from Bradford to Huddersfield. At the end of the year 21,410 telephones of the hand-microphone type were in use, while during the year eighty-four kiosks were erected, bringing the total to 972. The calls originated in the West Yorkshire district numbered 65,992,000, an increase of 13 per cent. International outgoing calls numbered 3,178, an increase of 793.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Argentina.—BUENOS AIRES.—April 23rd. State Railway Administration. Machinery and equipment for the electric power station at the Tafi Viojo workshops. (A.Y. 12894.)*

Australia.—MELBOURNE.—Posts and Telegraphs Department. April 2nd. Telephone switches of various types and accessories. (A.Y. 12903.)*

BRISBANE.—April 15th. City Electric Light Co. One 5,000 kW steam-driven turbo-alternator. (A.Y. 12896.)*

City Council. April 26th. Electrical equipment for the New Farm power house. (A.Y. 12910.)*

Aylesbury.—February 20th. Electricity Department. Materials for twelve months commencing April 1st next. (February 8th.)

Birmingham.—February 18th. Watch Committee. Electric clocks at the new central fire station. Specifications, &c., from H. H. Humphries, city engineer, Council House (deposit £2); tenders to the town clerk, Room No. 56A, Council House.

February 27th. Electric Supply Department. Prepayment meters for the period April 1st to September 30th next. (See this issue.)

Blackburn.—February 25th. Electricity Department. Cable, wire and meters for twelve months ending March 31st, 1936. (February 1st.)

Bridgend.—March 5th. U.D.C. Wiring of houses under assisted wiring scheme for twelve months. Specifications, &c., from the electrical engineer, Council Offices, "Glanogwr"; tenders to J. T. Howell, clerk to the Council, Court Road.

March 18th. Electricity Department. Transformers, switchgear, e.h.p. overhead and l.p. lines, &c. (See this issue.)

Brighton.—February 20th. Public Assistance Committee. Electrical fittings for the Public Assistance institution and Warren Farm schools. Particulars from and tenders to the Public Assistance Offices, Princes Street.

Bristol.—March 4th. Electricity Department. Joint boxes, fuse boxes, cable, flexibles, &c., for the year ending March 31st, 1936. (February 8th.)

Bromley.—February 28th. Electricity Department. L.p., e.h.p., and pilot cable. (See this issue.)

Buckinghamshire.—February 25th. County Council. Electric lighting installations during 1935-36. Particulars from County architect.

Canvey Island.—February 22nd. U.D.C. Electrically driven centrifugal pumps, with automatic switchgear, for sewage work. Particulars from the Council's engineer and surveyor.

Cardiff.—February 25th. Electricity Department. E.h.p. and l.p. cables and meters for the year ending March 31st, 1936. (February 8th.)

Church Stretton.—March 8th. U.D.C. Public lighting of urban district for three, five, seven and ten seasons. Particulars from U.D.C. surveyor.

Dagenham.—March 4th. Engineer and Surveyor's Department. Electrical wiring for lighting, heating and power at the new Central Depôt. (See this issue.)

Derbyshire.—February 19th. County Council. Electrical installations at the Belper, Chesterfield and Hayfield children's homes. Particulars from County architect (deposit £2 2s.).

Dover.—March 4th. Corporation. Meters, transformers, and cables for the year ending March 31st, 1936. (See this issue.)

East Lothian.—February 21st. County Council. Various work, including electrical, at mining department, Preston Lodge school, Prestonpans. Schedules from county architect, County Buildings, Haddington; tenders to G. Cruikshank, county clerk, Haddington.

Egypt.—CAIRO.—Ministry of Public Works. March 25th. Diesel pumping station at Alag. Specifications, &c., from the chief inspecting engineer, Egyptian Government, 41, Tothill Street, S.W.1 (deposit, not returnable, £1 0s. 6d.); tenders to the director-general, Mechanical & Electrical Department, Ministry of Public Works, Cairo.

March 6th. Electric workshop machines for the Belgas power station. (A.Y. 12923.)*

Erith.—March 4th. Electricity Department. Electrical accessories for the year ending March 31st, 1936. (See this issue.)

Eyemouth.—February 28th. Town Council. Various works, including electric lighting, of twenty-eight houses at the Glebe site. Forms from G. R. Wood, town clerk, Burgh Chambers, Eyemouth (deposit £1 1s.).

Fife.—February 19th. County Council. Installation of electricity at Oakley Roman Catholic and Carnock schools. Particulars from the County master of works, Education Offices, Kirkcaldy (deposit £1 1s.).

Glasgow.—February 19th. Corporation. Electric lighting at the extension of Hawkhead Mental hospital. Forms from Master of Works Department, City Chambers (deposit £2 2s.); tenders to town clerk.

February 18th. Electric lighting installation at Springfield Road, rehousing scheme. Specifications, &c., from general manager, Electricity Department, 75, Waterloo Street; tenders to town clerk.

Harrogate.—February 23rd. Electricity Department. Electrical stores for one year commencing April 1st next. (February 1st.)

Heston & Isleworth.—March 2nd. Electricity Department. Electrical stores for the year ending March 31st, 1936. (See this issue.)

Hornsey.—February 28th. Electricity Department. L.p. switchboard. (See this issue.)

Hull.—February 19th. Electricity Department. Meters and time switches. (February 1st.)

Ilford.—February 22nd. Electricity Department. Conversion of one 1,000-kW and one 500-kW rotary convertors to automatic and remote control. (February 1st.)

Lanarkshire.—February 19th. County Council. Electric lighting at twenty houses at Stonehouse. Particulars from P. C. Smith, County housing and town planning engineer, Hamilton.

Lincoln.—February 28th. Electricity Department. Electrical materials for the year ending March 31st, 1936. (February 8th.)

London.—STEPNEY.—March 4th. H.p. and l.p. cable for the year ending March 31st, 1936. (See this issue.)

STOKE NEWINGTON.—February 27th. Electricity Department. Meters and cables. (See this issue.)

Merton & Morden.—February 22nd. U.D.C. Traffic controlled light signals. (February 8th.)

Middlesex.—March 1st. Public Assistance Department. Electrical sundries for twelve months and X-ray, light, pathological and radium requisites, &c., for six months. (February 8th.)

Milford.—February 28th. Electricity Department. Electrical materials, meters and lubricating oil for the year ending March 31st, 1936. (February 8th.)

Mouldsworth (NEAR CHESTER).—March 18th. West Cheshire Water Board. Rotary deep borehole pump with electric motor and transformer, together with switchboards, starting gear, &c. Specifications, &c., from G. H. Hill & Sons (Manchester), 40, Kennedy Street, Manchester (deposit £5 5s.); tenders to the chairman of the Water Board, 11-15, Cross Street, Market Square, Birkenhead.

Newcastle-upon-Tyne.—February 22nd. Transport and Electricity Committee. 660-V paper-insulated l.c. cable. (February 8th.)

Penge.—February 23rd. U.D.C. Electric wiring at fifty houses at Anerley. Particulars from the Council's surveyor (deposit £2 2s.).

Ramsgate.—February 22nd. Corporation. Electrical apparatus for twelve months. Particulars from the town clerk.

Salford.—March 2nd. Electricity Department. Electrical stores. (See this issue.)

Siam.—BANGKOK.—April 12th. Royal State Railways. One self-contained welding plant consisting of a d.c. generator and an a.c. motor. (A.Y. 12897.)*

South Africa.—CAPE TOWN.—March 27th. Electricity Department. 4,000 four-pin sockets and plugs for use on electric ranges. (A.Y. 12921.)*

South Shields.—Town Council. Electrical installations in 148 houses to be built in Wenlock Road. Plans by J. Reid, borough engineer, Town Hall.

Stockton-on-Tees.—February 28th. Town Council. Automatic electrically driven pumps, wiring, &c., for Church Row sewage scheme. Particulars from the borough engineer (deposit £2 2s.).

Stoke-on-Trent.—March 4th. North West Midlands J.E.A. Outdoor type static transformers. (February 8th.)

Torquay.—March 1st. Electricity Department. H.p. switchgear, reactors, operating battery and connecting cables. (See this issue.)

Tottenham.—February 26th. Town Council. Vehicle-actuated traffic control signals at Lordship Lane-Lansdowne Road-High Road junction. Particulars from the borough engineer.

March 8th. Education Committee. Electrical installations in schools. (February 8th.)

Walsall.—March 5th. Electricity Department. Medium-pressure distribution accessories, transformers and switchgear. (See this issue.)

Walthamstow.—February 22nd. Electricity Department. Annual supply of e.h.p. and l.p. cables. (February 8th.)

Weymouth.—February 23rd. Entertainments Committee. Cable, steel poles, wire and lamps for illuminations. (See this issue.)

Whitby.—March 1st. U.D.C. Electrical stores for the year ending March 31st, 1936. (See this issue.)

Wiltshire.—February 23rd. Public Assistance Committee. Six months' supply of electric lamps for institutions, &c. Particulars from the public assistance officer, Trowbridge.

Wimbledon.—February 20th. Corporation. 11,000-V and 2,200-V p.i. cables during the period ending March 31st, 1936. (February 8th.)

---

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Accrington.—St. Anne's School Managers. Electric lighting installation at the school.—A. Marr (Blackburn).

Blackpool.—Electricity Committee. Accepted. E.h.p. switchgear for twelve months.—Switchgear & Cowans, Ltd.

Transport Committee. Accepted. Twenty rail coaches.—English Electric Co., Ltd.

Durham.—County Education Committee. Accepted. Electric lighting at Castletown Council school (£112).—Gray Bros. (Newcastle).

Glasgow.—Housing Committee. Accepted. Electrical work at West Craigton and Altyre Street, No. 2, housing schemes (£156).—D. Henderson.

Hebburn-on-Tyne.—U.D.C. Accepted. Electric lighting in 103 houses (£242).—B. L. Oliver (Birtley).

Ipswich.—Water Committee. Recommended. Electrically driven pumping plant (£1,492).—Sulzer Bros. (London), Ltd.

Luton.—R.D.C. Accepted. Electric lighting at houses at Bidwell Hill (£102), and Houghton Regis (£72).—R. J. Stearn & Co.

Manchester.—Education Committee. Accepted. Electrical installations: Styal cottage homes.—R. Seddon & Sons, Ltd. Juvenile employment bureau.—A. E. Sudlow & Co., Ltd.

Electricity Committee. Accepted.—Modification of stokers at Barton power station.—International Combustion, Ltd. For Stuart Street power station: L.p. circulating-water valves.—J. Blakeborough & Sons, Ltd.; Neutral earthing resistances—Ferguson, Pailin, Ltd. Switchgear battery at Dickinson Street power station.—Britannia Batteries, Ltd. Sub-contractors.—Westinghouse Brake & Saxby Signal Co., for metal rectifier; Laurence, Scott & Electromotors, Ltd., for motor generator, and Bertram Thomas, for switchboard. Annual contracts: Circulator immersion heaters.—Electric Fires, Ltd.; G. Bray & Co., Ltd. Self-contained storage heaters.—Archibald Low Electrics, Ltd.; Electric Fires, Ltd. Two planing machines and one electrically driven saw for the High Street depôt.—Wadkin & Co.

Northern Ireland.—BELFAST.—Public Health Committee. Electrically driven sewage pump at Purdysburn fever hospital (£625).—R. Craig & Sons, Ltd.

Northumberland.—Health Committee. Recommended. Electric ironing machine for Wooley sanatorium (£367).—D. & J. Tullis, Ltd.

South Shields.—Town Council. Accepted. Lighting of Ocean Road.—Revo Electric Co., Ltd.

Swindon.—Works Committee. Accepted. Traffic signals (£739).—Automatic Electric Co., Ltd.

Electricity Committee. Accepted. Electric battery vehicle (£225).—Partridge, Wilson & Co., Ltd.

Forthcoming Events

Institution of Electrical Engineers (*London Students' Section*).—Friday, February 15th. Institution, London, 7 p.m. "Domestic Water Heating." Mr. R. E. McInnes. Saturday, February 23rd. 3 p.m. Visit to Barking power station. (*North-Eastern Students' Section*).—Friday, February 15th. Armstrong College, Newcastle-upon-Tyne. 7.15 p.m. "Developments in the Materials of Construction of Electrical Plant and Apparatus." Mr. A. P. M. Fleming. (*North Midland Students' Section*).—Saturday, February 16th. 2.20 p.m. Visit to Messrs. Lewis's (Leeds), store. (*Tees-Side Sub-Centre*).—Monday, February 18th. Cleveland Technical Institute, Middlesbrough. 6.45 p.m. Particulars to be announced later. (*Western Centre*). —Monday, February 18th. South Wales Institute of Engineers, Cardiff. 6 p.m. "Organisation of Electric Supply in New Zealand." Mr. T. F. M. Kissel. Friday, February 22nd. University of Bristol. 7 p.m. Faraday Lecture. "Electricity in the Life of To-day." Prof. E. W. Marchant. (*Mersey and North Wales* (*Liverpool*) *Students' Section*).—Tuesday, February 19th. Meeting at Chester. (*North Midland Centre*).—Tuesday, February 19th. Hotel Metropole, Leeds. 7 p.m. "The Removal of Smoke and Acid Constituents from Flue Gases." Messrs. J. L. Pearson, G. Nonhebel and P. H. N. Ulander. (*North-Western Centre*).—Tuesday, February 19th. College of Technology, Manchester. 7.30 p.m. Faraday Lecture. Prof. E. W. Marchant. (*Scottish Students' Section*).—Wednesday, February 20th. Heriot Watt College, Edinburgh. 7.15 p.m. Paper by Mr. A. P. M. Fleming. Thursday, February 21st. Royal Technical College, Glasgow. 7.30 p.m. Paper by Mr. A. P. M. Fleming. (*Sheffield Sub-Centre*).—Wednesday, February 20th. Royal Victoria Hotel, Sheffield. 7.30 p.m. Address by Prof. W. M. Thornton. (*South Midland Students' Section*).—Wednesday, February 20th. Rugby. "Short Wave Radio Communication." Mr. D. R. Parsons. (*Transmission Section*).—Wednesday, February 20th. Institution, London. 6 p.m. Papers on cables by Messrs. L. G. Brazier and D. M. Robinson. (*Irish Centre* (*Dublin*)).—Thursday, February 21st. Trinity College, Dublin. 6 p.m. "Electrical Development of Northern Ireland." Mr. C. R. Westlake. (*Hampshire Sub-Centre*).—Friday, February 22nd. South-Western Hotel, Southampton. Conversazione and dance.

Association of Supervising Electrical Engineers.—Saturday, February 16th. Trocadero Restaurant, W.1. 6.30 p.m. Annual dinner and reunion. Tuesday, February 19th. Brettenham House, W.C.2. 7.15 p.m. "Modern Factory Equipment and Maintenance." Mr. J. H. Boyd.

Electrical Power Engineers' Association (*London Local Group*).—Monday, February 18th. "Mercury Arc Rectifiers." Mr. A. M. Brown.

Faraday House Old Students' Association.—Tuesday, February 19th. Hotel Great Central, N.W.1. 8 p.m. Annual dance.

Illuminating Engineering Society.—Tuesday, February 19th. Institution of Mechanical Engineers, S.W.1. 7 p.m. "Time Characteristics of Tungsten Filament Lamps for Flashing Signals." Messrs. J. M. Waldram and J. M. Sandford.

British Electrical Development Association (*South-West England and North Wales* (*Northern*) *Area*).—Wednesday, February 20th. Cardiff. Annual luncheon. (*South-West England and South Wales* (*Southern*) *Area*).—Thursday, February 21st. Royal Hotel, Bristol. 12.45 for 1 p.m. Annual luncheon.

Edinburgh Electrical Society.—Wednesday, February 20th. Philosophical Institution, Edinburgh. "Electrical Problems in Relation to Medicine." DR. A. Campbell.

Institution of Welding Engineers (*North-Western Branch*).—Wednesday, February 20th. Technical School, Ashton-under-Lyne. 7.15 p.m. "Metallic Arc Welding." Mr. W. L. McIvor.

Birmingham Electric Club.—Friday, February 22nd. Grand Hotel, Birmingham. 7 p.m. "Points of View on Tariffs."

Institution of Mechanical Engineers.—Friday, February 22nd. Institution, London. 5.30 p.m. "Some Mechanical Aspects of Electrical Design." Mr. D. B. Hoseason.

Royal Institution.—Friday, February 22nd. Institution, London. 9 p.m. "Some Experiments in Gravitation and Magnetism." Prof. A. O. Rankine. Saturday, February 23rd. Institution, London. 3 p.m. "Electromagnetic Radiations." Lord Rutherford.

Notes

The Generation of Electricity in January

The official returns rendered to the Electricity Commissioners show that 1,714 million kWh of electricity was generated by authorised undertakers in Great Britain during January last, as compared with the revised figure of 1,536 million kWh in the corresponding month of 1934, representing an increase of 178 million kWh, or 11.6 per cent. The number of working days in the month (*i.e.*, excluding Sundays) was twenty-seven, the same as last year.

The Batti-Wallahs' Luncheon

The monthly luncheon of the Batti-Wallahs' Society was held at the Hotel Metropole, London, on Wednesday last. Following the loyal toast, Mr. W. E. Highfield, president, introduced the principal guest, Lord Eustace Percy, who spoke of India, her condition and Government, present and prospective. The conclusion was, said Lord Eustace, that India's main problem was economic, namely, pressure of population upon means of subsistence. The already large population was increasing at the rate of 1 per cent. per annum. Some relief might be sought in emigration or industrialisation, but latterly all emigration avenues had been blocked. Great irrigation schemes had been undertaken with the object of increasing the export of grain. The jute industry had been developed in the interest of greater shipments overseas. Capital had been invested in the country for the benefit of international trade, but little had been invested in India for India itself.

The vote of thanks was proposed by Sir Montague Hughman. The next luncheon will be on March 7th when Mr. C. T. R. Hill will speak on flying.

Low-voltage Cooking at a Cafeteria

In a recent issue of the Australian *Electrical Trader* details are given of an interesting low-voltage cooking installation at a Cafeteria at the Central Railway Station, Sydney. The system was devised by Mr. W. H. Myers, chief electrical engineer to the Transport Department, and the voltages used are 32 and 16. At this low voltage the elements may be heated to much higher temperature than is usual without developing hot spots, while since the elements are open and radiant, ordinary utensils may be used.

The installation is fed from the 2,200 V mains through a single transformer which is capable of handling all the power requirements of the kitchens, the secondary being wound for 32 and 16 V. During the past six or seven months, three electric cooking tables, fish and chip fryers, two banks of grillers, a rotating spit and pie heaters have been in use, and these few articles alone have effected a saving in fuel costs to the extent of £800 per annum. It is the intention of the Department to extend the electrical apparatus and to entirely eliminate the gas and steam heated appliances. The large coke ovens will also be replaced by electric cooking devices on the unit system.

The Diesel Engine Users' Association

The annual dinner of the Diesel Engine Users' Association will be held on February 26th, at Pagani's Restaurant, W.1, when the president, Mr. A. E. Cornewall-Walker, will preside.

A Hysteretic Magnetic Separator

Among the exhibits on view at the City and Guilds College during the Jubilee celebrations, Mr. W. M. Mordey staged a small-scale demonstration of a new effect. He has previously shown that in the separation of substances magnetically the hysteretic material is repelled from a two-phase electro-magnet having an iron core excited by two coils forming a two-phase winding. The latest development of the method is that by dispensing with the iron core the repulsion remains the same, although for the same current the voltage required is reduced by two-thirds. Thus the energy needed for operation is reduced, as are also the weight and both the initial and running costs of the equipment. In other words, for this purpose an a.c. electro-magnet is better without an iron core.

Appointments Vacant

Probationary assistant engineer for the Post Office Engineering Department.

Showroom assistant for Hazel Grove and Bramhall Electricity Department.

Assistant consumers' engineer for Bromley Electricity Department.

Constructional engineer for Glasgow Electricity Department (salary £600, rising to £850).

Lady demonstrators for Willesden Electricity Department.

Assistant examiners in the Patent Office for the Civil Service Commission.

Mains foreman for Heston and Isleworth Electricity Department.

Commercial assistant for Nuneaton Electricity Department.

(See our classified advertisements.)

Makers' Names Wanted

NUBO auto fuses.
LUME insulating material.
TUCKER violet-ray set.

Our Personal Column

Electrical men are invited to keep readers of the "Electrical Review" posted concerning their movements

[*Borup, Streatham*
Mr. P. F. Rowell

Mr. P. F. Rowell, secretary of the Institution of Electrical Engineers, has had conferred upon him, on the recommendation of Monsieur Langevin, president of the Société Français des Electriciens, the Cross of an Officer of the Legion of Honour by the President of the French Republic.

Mr. F. Williams, engineer-in-charge of the Cardiff station of the B.B.C., has been appointed engineer-in-charge of the Birmingham station in succession to Mr. A. M. Jinman, who has resigned.

Mr. S. F. Whiting, station engineer at the Guildford Corporation electricity works, has resigned.

Marchese Marconi has been awarded the Wilhelm Exner Medal given annually by the Austrian Association of Commerce and Industry to persons "who (in the terms of the award) by their scientific work have given special increase to industrial production."

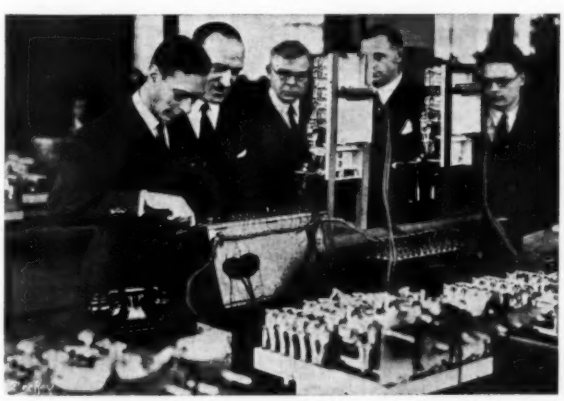
Mr. H. J. Mellows has been appointed manager of the St. James' and Pall Mall Electric Light Co., Ltd. He joined the company in 1911, was appointed stores and wages superintendent in 1927 and became accountant to the company in 1928.

[*Navana, Ltd.*
Mr. H. J. Mellows

Mr. J. Hamilton, superintendent of generation with the Liverpool Corporation Electricity Department, who was recommended by a sub-committee of the Electricity Committee for the post of deputy city electrical engineer in November last, has now been appointed to this position by the City Council.

Mr. G. A. Cock has been appointed by the British Broadcasting Corporation as Director of Television. Mr. Cock joined the B.B.C. staff in 1925, and later became outside broadcast director.

Mr. H. W. Puttick, District Electrical Engineer to the East Indian Railway (Dhanbad, India), is leaving Calcutta on March 1st for England *via* Japan and Vancouver. He will reach Vancouver on April 9, and letters intended to reach him there should be addressed to him on the s.s. "Empress of Japan," Vancouver. He will arrive in England by about May 20th, and correspondence to 17, Aubrey House, Maida Hill West, London, W.2, will find him.



The Duke of York inspecting automatic telephone gear at the New Southgate Works of Standard Telephones & Cables, Ltd. With him is Mr. T. G. Spencer, joint managing director

Mr. M. S. Bishop has been appointed sales manager to Messrs. Berkeley & Young, Ltd.; he succeeds his brother, **Mr. A. C. Bishop,** who has resigned to take up an appointment with the Hercules Cycle & Motor Co., Ltd. Mr. Bishop joined the company as sales engineer, and was promoted to assistant sales manager two years ago. He is taking over his new duties at a time when the company is rapidly expanding, its factory at Tyseley, Birmingham, having recently been enlarged to cope with new business. **Mr. A. C. Bates** has been appointed representative in the greater part of Mr. Bishop's former territory, the Midlands.

[*H. J. Whitlock & Sons, Ltd.*
Mr. M. S. Bishop

Mr. H. Peace, assistant mains superintendent with the Dewsbury Corporation Electricity Department, has been appointed mains superintendent with the Scunthorpe and Frodingham Electricity Department. Mr. Peace has been with the Dewsbury Corporation since 1917, having during that time occupied various positions in the commercial, generation, testing and mains departments. He received his technical training at the Dewsbury and Leeds Technical Colleges, and he is an associate member of the Institution of Electrical Engineers.

Mr. J. R. More, formerly general manager of the South African Government Railways, and **Professor Frankel,** of the Witwatersrand University, the local members of the recent commission of inquiry into the Johannesburg transport system, power station and workshops, have arrived in this country to consult with **Mr. C. J. Spencer,** chairman of the commission. It will be remembered that the commission's report on the transport system was completed before Mr. Spencer returned to England, but the report on the power station and workshops awaits completion, and Mr. Spencer desired to consult his colleagues on certain aspects of its contents. Mr. Spencer, who was formerly general manager of the London "Underground" group, is resident director of the North Metropolitan Electric Power Supply Co.

Obituary

Mr. J. J. A. Gilmore, Assistant Chief Inspector of Materials to the Air Ministry, died on February 1st at the age of forty-four. He was an associate member of the I.E.E.

Ald. J. Scott.—We regret to record the death of Alderman James Scott, consulting electrical engineer, which occurred on February 6th at his home in Bootle, following upon a long illness. He was well known in electrical circles in Lancashire, where he acted as consulting engineer to the Formby U.D.C. and the West Lancashire Rural District Council. He also carried out consulting work for a number of townships in Northern Ireland and for the West African Electric Development Co., Ltd. He was chairman of the Bootle Electricity Committee before the electricity undertaking was taken over by the Liverpool Corporation, and was one of Bootle's representatives on the Liverpool Electricity Committee and the Clarence Dock Power Station Sub-committee. He was Mayor of Bootle in 1932. He became an associate of the I.E.E. in 1904, an associate member in 1913, and a full member in 1926.

[*James Bacon & Sons*
The late Ald. J. Scott

Mr. C. W. Campion.—The death occurred suddenly last week in London at the age of fifty-four, of Mr. Charles Walter Campion, supervising engineer of the Erection Department of the British Westinghouse Co. and the Metropolitan-Vickers Electrical Co. for nearly thirty years. He was an apprentice

of Messrs. W. H. Allen Sons & Co., of Bedford, afterwards joining the erection staff of the B.T.H. Co. for a short time. He then became associated with the British Westinghouse Co. and was chief erection engineer for the North Eastern area centred in Newcastle for some years. Latterly Mr. Campion had been responsible for putting in commission the electrification of the line from Pietermaritzburg to Ladysmith, South Africa, the new power station of the Bristol Corporation at Portishead, and the super power station at Montevideo of the Uruguayan Government.

Mr. J. H. Birtles.—The death has occurred of Mr. J. Henry Birtles, who was for fifteen years the Midland representative of Messrs. Kent Bros. Electric Wire Co., and E. H. Phillips, Ltd. He was well known in Birmingham, and was for many years actively interested in Rugby football, being first president of the Birmingham Rugby Football Club.

Mr. F. V. Calverley, of the sales staff of Burnley Components, Ltd., died in hospital on February 7th, following an operation. He was at one time the company's representative in the Midland Counties, but had recently been working in Ireland and the South Wales districts.

Mr. W. G. Aitken.—The death occurred on February 11th of Mr. William G. Aitken, for twenty-one years mains superintendent of the Whitehaven Corporation Electricity Department. Mr. Aitken had previously been with the Paisley and Perth electricity undertakings.

Will.—Mr. A. F. Harris, M.I.E.E., managing director of Messrs. Nalder Bros. & Thompson, Ltd., left £7,839 (net personalty £7,639).

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Dowsing Co. (Electrical Manufacturers), Ltd.—Private company. Registered February 4th. Capital, £5,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in all kinds of electrical apparatus and machinery, lamps, heaters, electrical appliances and accessories, &c. The subscribers are: F. W. J. Cripps, 3, St. Mary's Avenue, Shortlands, Kent; and S. B. Smith, 4/6, Throgmorton Avenue, E.C.2. Solicitor: Ernest G. Scott, 33/4, Broad Street Avenue, E.C.2.

Resistoid, Ltd.—Private company. Registered February 2nd. Capital, £2,000 in £1 shares. Objects: To acquire the business of insulating coverers, now carried on by Harry Williams, Arthur Williams and Stanley A. Collins at 15, Upper Camp Street, Salford, as "The Resistoid Covering Co.," and to carry on the business of general engineers, ironfounders and mechanical engineers, contractors and suppliers of electricity and medical electrical equipment, electrical, telegraph, telephone and general engineers, cable makers, &c. The first directors are: J. C. Edge, "Bleasdale," Bramhall, Ches., and three others. Registered office: 48/50, Chapel Street, Salford.

W. J. Burke & Co., Ltd.—Private company. Registered February 2nd. Capital, £2,000 in £1 shares. Objects: To carry on the business of electrical engineers, contractors and merchants, wireless manufacturers, &c. The directors are: W. J. Burke, 61, Hendon Way, Golders Green, N.W.2; and Miss M. E. Juckes, 126, Alexandra Road, St. John's Wood, N.W.8. Secretary: M. E. Juckes. Registered office: 116, Finchley Road, Hampstead, N.W.3.

Lincoln & Egerton, Ltd.—Private company. Registered February 9th. Capital, £1,000 in £1 shares (500 5 per cent. cumulative preference and 500 ordinary): Objects: To carry on the business of manufacturers of and dealers in radio or wireless, television, telephone and telegraph instruments or apparatus, gramophones, radio gramophones, mechanical or electrical instruments for recording or reproducing sound, musical instruments, &c. The subscribers are: T. F. W. Lincoln, "Bryker," Cley Lane, Bradwell, Suffolk, and J. F. Egerton, "The Bungalow," Great Ormesby, Norfolk. Secretary: John F. Egerton.

Caledonian Radio Works, Ltd.—Private company. Registered in Edinburgh February 6th. Capital, £1,500 in £1 shares. Objects: To carry on the business of radio and electrical engineers, electricians, electro-platers, welders, scientific instrument makers, cabinet makers, &c. The subscribers are: T. S. Martin, 49, Castle Street, Edinburgh; and A. Taylor, 6. Dewar Place, Edinburgh.

H. A. Birch & Co., Ltd.—Private company. Registered February 7th. Capital, £2,000 in £1 shares (500 10 per cent. redeemable cumulative preference and 1,500 ordinary). Objects: To carry on the business of electrical and mechanical engineers, lighting, heating and refrigerating engineers, iron and brass founders, manufacturers of and dealers in electrical goods. wireless sets, &c. The first governing directors are: H. A. Birch, Hazelmere, Penn House Avenue, Wolverhampton; and E. B. Westwood, Lombard House, Great Charles Street, Birmingham. Secretary: E. B. Westwood. Registered office: Wood Street, Willenhall, Staffs.

Alandale Radio & Television Co., Ltd.—Private company. Registered January 31st. Capital, £1,000 in £1 shares. Objects: To carry on the business of wholesale and retail wireless and electrical dealers, buyers and sellers, either for cash, credit, or on hire-purchase terms, &c. The first director is L. Lavender, 28, Vernham Road, Plumstead, S.E.18. Registered office: 6, Beresford Square, Woolwich, S.E.18.

Returns of Electrical Companies

Tricity Cookers, Ltd.—Debenture, dated January 22nd, 1935, to secure £7,000, charged on the company's interest in leasehold premises No. 44, Parsonage Lane, Enfield, certain patents, &c., and the company's undertaking and other property, present and future, including uncalled capital. Holders: Berry's Insulating & Building Products, Ltd., Wellington House, 125-130, Strand, W.C.2.

Electric Development & Securities Trust, Ltd.—Deed of further charge and further security and variation of security, dated January 29th, 1935 (supplemental to mortgage dated January 27th, 1932), securing sums not exceeding at any one time, with the sums secured by the mortgage of January 27th, 1932, £750,000, charged (*inter alia*), on moneys which are (as at the date of the mortgage) or shall at any time thereafter be owing to the company by various other companies. Holders: Prudential Assurance Company, Ltd.

Ultra Electric, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated January 23rd, 1935, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Partridge & Mee, Ltd.—Capital, £4,000 in £1 shares. Return dated December 6th, 1934. 2,405 shares taken up. £2,405 paid. Mortgages and charges: £3,000.

British Dry Cell Co., Ltd.—C. Wakeling, accountant, of 8, Serjeants Inn, E.C., was appointed Receiver on February 6th, 1935, under powers contained in debentures dated May 25th, 1934.

Frank Raworth, Ltd.—Capital £3,000 in £1 shares. Return dated November 30th, 1934. 2,222 shares taken up. £2,022 paid. £200 considered as paid. Mortgages and charges nil.

Ever Ready Electric Bulb Co., Ltd.—Capital, £10,000 in £1 shares. Return dated December 6th, 1934. 2,500 shares taken up. £2,500 paid. Mortgages and charges nil.

Crosland, Ltd.—Capital, £2,000 in £1 shares. Return dated January 19th, 1935. 1,002 shares taken up. £1,002 paid. Mortgages and charges nil.

Burndept, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated January 14th, 1935, to secure all moneys due or to become due from the company to Barclays Bank Ltd.

Vidor, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated January 14th, 1935, to secure all moneys due or to become due from the company to Barclays Bank Ltd.

"M.P.A." Wireless (1930), Ltd.—Capital £10,000 in 1s. shares. Return dated January 11th, 1935. 81,227 shares taken up. £61 7s. paid. £4,000 considered as paid. Mortgages and charges: £21,295.

R.A.P., Ltd.—Issue on January 30th, 1935, of £100 debentures, part of a series already registered.

Park Radio Relay (Gt. Harwood), Ltd.—Debenture dated January 30th, 1935, to secure £95 10s. 11d., charged on the company's undertaking and property, present and future, including uncalled capital. Holder: T. W. Waddington, 74, Blackburn Road, Padiham, Lancs.

City Notes

The London Power Co., Ltd., reports that the revenue from the sale of electricity rose from £2,209,479 in 1933 to £2,711,323 in 1934, of which £399,717 was from sales to the Central Electricity Board and £2,311,606 from sales to the constituent companies. After meeting all general and other charges, debenture interest, &c., the dividend on the share capital is maintained at 6 per cent. The electricity generated during the year amounted to 1,581,662,730 kWh. and the output of the stations has increased from 1,127,726,874 to 1,503,022,825 kWh, an advance of 33.27 per cent. The kW demand rose from 394,800 to 421,000. The supply to the Central Board during the year, apart from the company's own requirements, amounted to 436,000,000 kWh, as against 148,000,000 kWh in 1933, an increase of 194 per cent. At the end of the year the total effective plant capacity to meet the requirements of the London Power Co. and the C.E.B. amounted to 484,000 kW. The output of the Battersea power station exceeded that of any of the other stations of the company. Presiding at the annual meeting held on February 8th Sir Francis Fladgate (chairman) said that the two main objects in view when they applied for the Act of 1925 were an increase in the reliability of supply and improved efficiency in operation leading to a decrease in the cost of production. By the linking up of their stations a great measure of safety was added. With regard to the reduction of costs, in 1926 the average total cost per kWh to the constituent companies was 0.983d. For 1933 the figure was 0.5195d. per kWh. For 1934 the average charge per kWh showed an increase of 8 per cent. over 1933, though the actual cost of production was appreciably reduced. With regard to the operation of their stations under the control of the Central Board, the combined efforts of the officials of the Board and their own staff would in time succeed in finding a solution to the many

technical problems incidental to a scheme of this magnitude and complexity. The breakdown in July last had been looked into and it was hoped that the suggestions for additional precautions and safeguards would serve a good end. During the past twelve months the company had on several occasions been able to render assistance, through the Central Board, to various undertakers in the South-East areas by taking up loads at very short notice ranging from 8,000 kW to 25,000 kW. Turning to the financial arrangements between the company and the Central Board no agreement had yet been reached as to the price. In making up charges to the Central Board for 1934 only such sums as could definitely be ascertained as not being due to independent operation had been included, leaving open for discussion any items which could not be easily allocated. The result was disappointing, as in effect the whole of the capital charges and the bulk of the fixed costs relative to the Battersea, Deptford West, and Willesden stations had to be borne by the company. They had exported to the Central Board 400,000,000 kWh for the use of the grid. This consumption for the Board amounted to approximately four-twelfths of the whole output from the Deptford West, Battersea and Willesden stations, but the sum included in the accounts for the Board amounted to only two-twelfths, a very wide disparity. They had thought it right to put these facts before the Board and remind it that under the supplementary particulars published in September, 1927, the promoters of the scheme suggested that if it were adopted there would be a gross annual saving to the Power Company of over £400,000. While some authorities might reap advantage, others, and those who like themselves were giving the most important assistance to the Central Board, were not receiving equitable treatment, and he felt that nothing short of an amendment to the Act of 1926 would ensure equitable treatment and thus ease the situation. Referring to the endeavour which was being made to bring about a co-ordination of distribution companies, he wished the scheme success as it was in that direction that many anomalies in the sale of electricity in various districts of London would best be ended. The Battersea station had now attained an overall efficiency of slightly over 28 per cent., and better results might be anticipated shortly. The chairman concluded by paying tribute to the work of the staff and specially referred to the important work of Dr. Pearce, engineer-in-chief, and Mr. Pearman, the general manager.

The Tata Power Co., Ltd., is making an issue of £765,000 2 per cent. "A" mortgage debenture stock, 1948, at 98 per cent. The stock is guaranteed as to principal and interest by H.M. Treasury under the provisions of the Finance Act, 1934, and it will be repayable over the years 1935 to 1948 by the operation of a cumulative sinking fund to be applied in purchasing stock at or under par, or by drawings at par. It will be secured by a trust deed in favour of the Whitehall Trust, Ltd. These charges will rank behind the charges securing the £4 10s. per cent. guaranteed "A" mortgage debenture stock until that stock is redeemed in full. Holders of the 4½ per cent. guaranteed "A" mortgage debenture stock, called for redemption on May 15th next, may, up to February 15th, surrender their holdings in multiples of £100 and receive in exchange a like amount of £2 per cent. stock of the present issue together with a cash payment at the rate of £2 per cent. on the nominal amount of stock surrendered. The list of cash applications was opened and closed on Friday last, and the list of conversion applications closes to-day (Friday).

The Yorkshire Electric Power Co. reports a net profit for the year ended December 31st last of £445,942, as compared with £439,665 in the preceding year. To this is added £82,058 brought in, making £528,000. The dividend on the ordinary stock for the year is maintained at 8 per cent. The depreciation and reserve fund receives £175,000, increasing this fund to £1,225,000; the plant renewals fund receives £35,000; and a balance of £87,531 is carried forward. The report states that the improvement in trade and manufacture noted in 1933 continues, and the amount of electricity sold again shows a substantial increase. The sales to consumers increased from 235,902,400 to 268,617,177 kWh, and to the Central Electricity Board from 143,704,843 to 149,305,060 kWh. Price reductions and increased payment for rates account for a relatively smaller increase of profit. Capital has been expended on extensions of mains and sub-stations to meet the growing demands in the company's areas, and investments in associated and subsidiary companies have also been increased. In the North Lincolnshire and Howdenshire area a general system of supply has been successfully established. The Barton-upon-Humber U.D.C. has agreed that an application should be made to the Electricity Commissioners to permit of the transfer of the Barton Order to the North Lincolnshire Co. The employés' pension fund, established by the amount transferred last year, is being brought into operation as from January 1st, 1935. Mr. C. W. H. Glossop has been elected to the board to fill the vacancy caused by the resignation of Sir T. O. Callender. Meeting: February 19th.

Hall Telephone Accessories (1928), Ltd., reports a net profit for 1934 of £34,717, as compared with £34,617 in the preceding year, to which is added £6,956 brought in and £3,605 over-reserved for income-tax in the previous year, making £45,279. General reserve and income-tax reserve receive £19,500, and it is proposed to pay a final dividend of 5 per cent., less tax, plus a bonus of one per cent., making 11 per cent. for the year (against 10 per cent.), leaving £7,137 to be carried forward. The report states that the G.P.O. has begun installing the company's pre-selector auto-dialling instruments. Other new business is being developed. New factory buildings have been equipped and brought into service, and the current year has begun with a satisfactory volume of general work spread over all departments. Meeting: February 19th.

The Bristol Tramways & Carriage Co., Ltd., reports a revenue for the year ended December 31st last of £1,175,043, as compared with £1,148,127 in the preceding year. It is proposed to pay a final ordinary dividend of 4 per cent., making 6 per cent. for the year (against 5 per cent.), to place £15,000 to reserve for contingencies and renewals, and to carry forward £9,826. The report states that the receipts of the Tramway Department show a decrease of £524 and those of the Carriage Department an increase of £29,099. The number of passengers carried on the cars and omnibuses was 129,921,926, an increase of 3,180,686 as compared with the preceding year. Meeting: February 21st.

The Mid Southern Utility Co. reports a profit for 1934 of £106,271, as compared with £87,802 for 1933. Increased sales of electricity were mainly responsible for the higher profit. After providing for dividends on the consolidated preference stock, debenture interest, &c., and the statutory dividends for the half-year ended June 30th last, the directors recommend the full statutory dividends of £6 4s. per cent. per annum on the "A" stock, £4 14s. per cent. per annum on the "B" stock, and £5 per cent. per annum on the "C" stock for the latter half of the year, leaving £20,025 to be carried forward.

The Power Securities Corporation, Ltd., reports a net profit for 1934 of £100,297, as compared with £99,108 in the preceding year, to which is added £26,322 brought in, making £126,620. The ordinary dividend is maintained at 7 per cent., a sum of £30,000 is again placed to reserve, and £26,095 is carried forward. The valuation of investments at December 31st last showed that the aggregate value was in excess of the balance sheet total of £1,479,676.

Companies Struck Off the Register.—The names of the following companies have been struck off the Register and they are thereby dissolved:—Electracts, Ltd.; Electrical Importers (Hull), Ltd.; Hardy Electric, Ltd.; Milford Haven Electric Welding Co., Ltd.; Southern Counties Radio, Ltd.

Companies to be Struck Off the Register.—The names of the following companies will be struck off the Register at the expiration of three months, unless cause is shown to the contrary:—Associated Wireless Co., Ltd.; Electradio Co., Ltd.; Southern Counties Electric Light & Power Supply, Ltd.; Wareham Electric Supply Co., Ltd.

Rushden & District Electric Supply Co., Ltd.—Correction.—We regret that owing to a printer's error in our last issue it was stated that the final dividend of 4½ per cent. made a total of 3 per cent. for the year. The total of course was 8 per cent.

Mather & Platt, Ltd., have declared a final ordinary dividend of 5 per cent., making 7½ per cent. for the year (against 6 per cent.). The amount carried forward is £40,655, against £22,346 brought in.

Edmundson's Electricity Corporation, Ltd., reports that the results of the operations of its group of companies during January last as compared with the corresponding month of 1934 show an increase of 14 per cent. of kWh sold.

The St. James' & Pall Mall Electric Light Co. has announced a final dividend on the ordinary shares of 3½ per cent., making 7 per cent. for the year, together with a bonus of 1¼ per cent., making the total distribution 8¼ per cent. (against 7½ per cent.).

The Westminster Electric Supply Corporation, Ltd., is paying a final ordinary dividend of 3½ per cent., maintaining the distribution for the year at the standard rate of 7 per cent.

The Electrical Distribution of Yorkshire, Ltd., has declared a final dividend on the ordinary stock of 4½ per cent., maintaining the distribution for the year at 9 per cent.

The Consolidated Electric Light and Power of Baltimore has announced a dividend of 90 cents on the common shares for the quarter ending March 31st.

Clarke, Chapman & Co. have declared an ordinary dividend of 5 per cent. for 1934. No dividend was paid on the ordinary capital for 1933.

Stocks and Shares

TUESDAY EVENING.

STOCK Exchange markets have fallen under the influence of a number of disturbing factors, the operation of which has served to bring about heavy falls in the prices of British Government securities, investment stocks, and in more speculative issues as well. Political clouds on the Continent, reported dissension in the Cabinet at home, the results of various recent by-elections, the failure of several gilt-edged loans, of substantial amount, to receive unqualified public support, make up a quartet of the reasons which are exercising a very definite effect over Stock Exchange markets as a whole. Part of the selling has been on behalf of people who were raising funds in order to meet the liabilities incurred elsewhere. In the absence of a fresh accession of buyers, these sales have served to put down prices in a marked manner. The falls are out of proportion to the volume of business done, but they are widely spread and rather disquieting.

Public Boards' Stocks

Central Electricity 4½ per cents. of 1951-1973 are a point up. The 4½ per cent. "A" and the 5 per cent. "B" stocks of the London Transport Board are similarly lower. Transport "C" stock holds its recovery to 95. The Home Railway market as a whole has been cheered by a decision given in favour of the Southern Railway in connection with the rating of the company. This was so considerably lowered as to provide a pleasant surprise, and it was followed by a satisfactory dividend announcement. Prices responded with brisk advances, all of which got lost, however, in the fog of depression that settled over markets for the reasons detailed in the previous paragraph.

Tata Two Per Cents.

The Government broke fresh ground last week in the way of low interest stock by guaranteeing an issue of 2 per cent. "A" mortgage debenture stock, 1948, offered by the Tata Power Company at 98. In spite of what may seem to be the prohibitive terms, the subscription lists were closed five minutes after they opened. Holders of the company's 4½ per

cent. stock, which is being repaid, have, however, the right up to Friday in this week to convert into the new issue. In consequence, there will be no market in the stock until Monday next.

The speech by Sir Francis Fladgate at the London Power Company deserves study by anyone who is interested in the supply and distribution of electricity on a large scale. Sir Francis considers that only an amendment of the financial provisions of the Electricity Act of 1926 can rectify what he regards as being an inequitable situation.

London Associated Electricity

The chief item of interest in connection with the London Electricity supply undertakers is the formation of the London Associated Electricity undertakings, which was reported in the last issue of the ELECTRICAL REVIEW. The importance of the newcomer is generally recognised. Where it is likely to assist the interests of the ordinary shareholders will be in the direction of reducing costs. The closer co-operation which it will make possible between the big companies is also a matter which shareholders will regard with satisfaction. The six London companies, the bulk of whose capital it is proposed to acquire, have an aggregate share capital of nearly seven million pounds, the principal contributor being Charing Cross, £2,654,000, followed by the Westminster Electric with £2,000,000. The smallest of the sextet as regards share capital is the Brompton & Kensington Co., with £419,000.

Two Rises: Twenty-one Falls

London Electric Supply ordinary shares at £2 have risen 3s. upon the announcement of the company that it will pay a bonus of 1 per cent. on the ordinary shares. The dividend is left at 7 per cent., and the extra distribution of 1 per cent. represents the proportion of the consumers' benefit under the sliding scale scheduled in the Act. Electrical Distribution of Yorkshire at 50s. are 1s. lower. The dividend of 4½ per cent. just declared makes 9 per cent. for the year, and, incidentally, a total of 81 per cent. for the past nine years. At the present price, the return on the money comes to £3 12s. per cent. Clyde Valleys are better at 43s. 6d. Other shares in this group are lower. On this, Tuesday, afternoon, the ordinary shares of twenty-one different electricity supply companies were put down by pence ranging from three to nine.

Television

Remarkable fluctuations have been taking place in the shares of the companies connected with television. Of these, the principal have centred round the shares of the Baird Television Company. The deferred rose from 7s. to double that price, to revert to 7s. 6d., while the preferred went from 5s. 3d. to 8s. 3d. in a single day, to drop later on to 4s. 6d. The company's "A" shares, theoretically worth about fifteen times as much as the preferred, touched 3¾ before losing the 15s. These changes suggest public dealings on a lively scale, but the speculation was confined to a fairly narrow circle; it attracted widespread attention, of course, by reason of the extraordinary movements that occurred. To a minor degree, Gaumont shares were also affected. Electric & Musical Industries strengthened to 34s. and relapsed to 32s. in the general malaise of markets.

Cable and Wireless

The Stock Exchange market is looking for some announcement in respect of the Cable & Wireless dividend at about the end of next month. Last year 2¾ per cent. actual, being half the full dividend due on the preference stock, was paid in May. In view of the published traffics, expectation looks for 3½ to 4 per cent. actual for the year recently ended. Caution takes the view that the revenue will probably show sufficient profit to justify 4 per cent. being paid, but that the Board will be more likely to distribute 3½ per cent. than to scrape the pot clean. Between Cable & Wireless preference stock and London Passenger Transport "C" stock there is a sort of similarity, in the scope for extended dividend payment that can be made in both cases when earnings permit.

Great Northern Telegraphs have put on their regular weekly 10s., at 39½. Marconi Marines lost 9d. of their previous gain of 3s. 3d. American Telephone fell 2, Anglo-American preferred 1; Globe Telegraphs show no change.

Manufacturing and Equipment

Enfield Cable ordinary rose 7s. 6d. to 5 5/16, reacting, however, 2s. 6d. from the best, on buying based upon the impression that the company will increase its previously paid 20 per cent. dividend to 25 per cent. Enfield Rolling Mills hold their price at 28s. 3d. The debenture has risen a point to 102½. Something of a collapse occurred in Ever-Ready shares, the price giving way abruptly from a guinea to 19s., from which there was a faint recovery that left the price at 19s. 6d. Fears as to the maintenance of the dividend are the principal reason for the weakness. Callender's rose to 70s., British Insulated to 80s., and Henley's to 7 1/16, contributing to the strength shown by the cable equipment market as a whole. Crompton Parkinsons, after their heavy fall, rallied to the extent of half a crown. General Electric ordinary are lower at 48s. 9d.; the new shares are quoted at 47s. 3d. Reyrolles at 59s. 9d. have lost a few pence. Hall's Telephone Accessories, upon which a dividend of 11 per cent. is declared, responded to the increase of 1 per cent. by advancing to 20s. 9d. Telegraph Constructions improved to 22s. 6d. on anticipations of a dividend payment.

Share List of Electrical Companies

HOME ELECTRICITY COMPANIES.

	Nom.	Dividend. 1932.	Dividend. 1933.	Price. Feb. 12.	Rise or Fall.	Yield. p.c. £ s. d.
Bournemouth and Poole	1	15	15	79/6	—	3 15 5
Brompton Ordinary	1	7	7	36/–	—	3 17 9
Charing Cross Ordinary	1	7	7	36/–	—	3 17 9
Chelsea	1	7	7	36/–	—	3 17 9
City of London	1	7½	7½	38/–	–6d.	3 19 0
Clyde Valley	1	7	7	43/6	+6d.	3 4 5
County of London	1	10½	10½	59/–	—	3 11 2
Edmundson's 7% Pref.	1	7	7	36/6	–6d.	3 16 8
Elec. Dis. Yorkshire	1	9	9	50/–	–1/–	3 12 0
Elec. Supply Corporation	1	11	11	58/9	—	3 14 10
Kensington Ordinary	1	7	7	36/–	—	3 17 9
Lancs Light and Power	1	7	7½	39/6	—	3 16 0
London Electric	1	7	7	2	+3/–	3 10 0
Metropolitan	1	10	10	55/6	–6d.	3 12 5
Midland Counties	1	7	7	39/6	—	3 10 10
Mid. Elec. Power	1	8	8	50/–	—	3 4 0
North Eastern Electric Ordinary	1	6	6	34/–	–1/–	3 10 7
Do. 7% Pref.	1	7	7	35/6	—	3 19 0
Northampton	1	10	10	57/6	–9d.	3 9 4
Notting Hill 6% Pref.	10	6	6	14½	—	4 4 4
North Met. Elec. Ordinary	1	10	10	63/6	–6d.	3 3 0
Do. do. 6% Pref.	1	6	6	32/6	–6d.	3 13 10
St. James' and Pall Mall	1	7	7½	38/–	—	3 19 0
Scottish Power	1	8	8	44/–	–6d.	3 12 9
South London	1	7	7	36/–	—	3 17 9
Westminster Ordinary	1	7	7	36/6	—	3 16 9
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	28/3	—	5 6 1
Yorkshire Elec.	1	8	8	48/–	—	3 6 8

PUBLIC BOARDS.

		Dividend. 5	Dividend. 5	Price.	Rise or Fall.	Yield. p.c. £ s. d.
Central Electricity, 1950–70	Stock	5	5	116xd	—	4 6 2
Do. 1955–75	,,	5	5	120	—	4 3 4
Do. 1951–73	,,	4½	4½	112	+1	4 0 4
Do. 1963–93	,,	—	3½	103	—	3 8 0
London & Home Counties, 1955–75	,,	4½	4½	113	—	3 19 8
London Passenger Transport, A	,,	—	4½	127½	–1	3 10 6
Do. do. B	,,	—	5	129½	–1	3 17 3
Do. do. C	,,	—	3	95	—	3 3 2
West Midlands Joint Elec. 1948–68	,,	—	5	118	—	4 4 9

TELEGRAPH AND TELEPHONE.

American Tel. & Tel.	$100	9	9	106	–2	8 10 0
Anglo-Am. Tel. Pref.	Stock	6	6	123	–1	4 17 7
Do. Def.	,,	1½	1½	30	—	5 0 0
Cable & Wireless 5½% Pref.	,,	2¾	2¾	85	—	3 4 8
Do. A. 7½% Ord.	,,	Nil	Nil	19½	–½	—
Do. B. Ord.	,,	Nil	Nil	6½	–½	—
Globe Tel. and T. Ord.	10	Nil	2½	11½	—	2 3 5
Do. do. Pref.	10	6	6	13⅜	—	4 8 0
Great Northern Tel.	10	20	20	39½	+½	5 1 3
Marconi-Marine	1	10	7½	37/6	–9d.	4 0 0
Oriental Telephone Ord.	1	12	12	3 1/16	—	*3 12 5

HOME AND FOREIGN TRAMS, ETC.

Anglo-Arg. Trams First Pref.	5	Nil	Nil	1/6	—	—
Do. do. 2nd Pref.	5	Nil	Nil	1/6	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	4	—	—
British Electric Traction Df. Ord.	,,	5	5	980	–15	—
Do. do. Pref. Ord.	,,	8	8	172½	—	4 12 9
Brazil Traction	100	—	—	10	—	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	107½	—	4 13 0
Mexican Light Common	100	Nil	Nil	3½	—	—
Do. 7% Pref.	100	7	7	4½	—	—
Do. 1st Bonds	$500	5	5	48	—	—
Victoria Falls Ord.	1	15	20	7 1/16	–¼	2 16 6
Yorkshire (West Riding)	1	2½	5	28/3	—	3 10 9

MANUFACTURING COMPANIES.

Aron Electricity Ord.	1	10	10	66/3	—	3 0 3
Assoc. Elec. Ord.	1	4	3	25/–	—	2 8 0
Do. Prf.	1	8	8	38/9	—	4 2 7
Babcock & Wilcox	1	9	6	47/6	–9d.	2 10 9
British Aluminium Ord.	1	5	5	33/–	—	3 0 7
British Insulated Ord.	1	5	15	4	+ 1/16	3 15 0
Brush Ord.	Stock	Nil	Nil	42½	—	—
Callender's	1	15	15	3½	+ 1/16	4 5 9
Do. 6½% Pref.	1	6½	6½	32/6	—	4 0 0
Crompton Parkinson Ord.	5/–	22	12½	34/6	+½	1 16 3
Do. 8% Pref.	1	8	8	35/–	—	4 11 5
Edison-Swan 1st Pref.	1	7½	7½	23/9	—	6 6 4
Electric Construction	1	Nil	Nil	15/–	–1/16	—
Enfield Cable Ord.	1	25	20	5 5/16	+¼	3 17 0
English Electric	1	Nil	Nil	6/9	–9d.	—
Do. do. Pref.	1	Nil	Nil	12/6	—	—
Ever Ready	5/–	35	35	19/6	–1/6	8 19 6
Ferranti Pref.	1	7	7	29/–	—	4 16 7
G.E.C. Pref.	1	6½	6½	35/–	—	3 14 4
Do. Ord.	1	8	8	48/9	–9d.	3 5 7
Henley's	1	30	30	7 1/16	+ 1/16	4 5 0
Do. 4½% Pref.	5	4½	4½	5½	—	3 16 8
India-Rubber Preferred	1	—	—	1½	—	—
Johnson & Phillips	1	5	5	29/6	—	3 7 8
Siemens Ord.	1	6½	4	21/3	—	3 15 4
Telegraph Construction	£1	Nil	Nil	1½	+ 1/16	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1933

10713. "Magnetic body, preferably for weak-current purposes, and processes for its production." Siemens & Halske Akt.-Ges. April 9th, 1932. (422780.)

11622. "Apparatus for magnifying the effects of vibrations of small amplitude." Orlings' Patents, Ltd., A. Orling and C. W. Orling. April 21st, 1933. (422736.)

14319. "Dynamo-electric machines." A. G. Williamson, K. W. D. Roberts, and Associated Electrical Industries, Ltd. May 2nd, 1934. (Addition to 391563.) (422782.)

17130. "Electric fans." F. C. Andrews. June 15th, 1933. (422559.)

17249. "Electric motor control systems." British Thomson-Houston Co., Ltd., and L. J. Clark. June 16th, 1933. (422553.)

19651. "Electrical remote-control systems for motors operating between limits." International General Electric Co., Inc. July 11th, 1932. (422702.)

19711. "Snap-action electrical switches of the enclosed or iron-clad type." Simplex Electric Co., Ltd., P. W. Davis and W. E. Hill. July 12th, 1933. (422703.)

19783. "Electrically-heated oven." F. Turner. July 13th, 1933. (422785.)

19850. "Electric converting circuits." British Thomson-Houston Co., Ltd. July 13th, 1932. (422565.)

19975. "Electric-arc convertor arrangements." General Electric Co., Ltd., and W. S. Milner, July 14th, 1933. (422787.)

20011. "Electric motors." International General Electric Co., Inc. July 14th, 1932. (422788.)

20087. "Telephone systems." Automatic Electric Co., Ltd. July 16th, 1932. (422570.)

20110. "Cathode-ray tube." Radioakt.-Ges. D. S. Loewe, and K. Schlesinger. July 18th, 1932. (422708.)

20314. "Electrolytic cells." I. G. Farbenindustrie Akt.-Ges. July 19th, 1932. (422790.)

20343. "Indicating devices in conjunction with electric switches." W. Donovan, jun. July 19th, 1933. (422632.)

20366. "Protection of electric water-heating apparatus." A. Reyrolle & Co., Ltd., and H. Leyburn. July 19th, 1933. (422851.)

20393. "Television and the like transmission systems." Electric & Musical Industries, Ltd., M. Bowman-Manifold, and W. S. Percival. July 19th, 1933. (422710.)

20463. "Radio receivers employing automatic volume control." E. K. Cole, Ltd., and A. W. Martin. July 20th, 1933. (422858.)

20473. "Electric lamp mountings." A. Reyrolle & Co., Ltd., and J. Tiplady. July 20th, 1933. (422859.)

20535. "Electric motors." International General Electric Co., Inc. July 21st, 1932. (422795.)

20628. "Magneto generators." British Thomson-Houston Co., Ltd., and L. Griffiths. July 21st, 1933. (422863.)

20642. "Radio and other modulated carrier or like receivers." Marconi's Wireless Telegraph Co., Ltd., and A. A. Linsell. July 21st, 1933. (422866.)

20746. "Electrode furnaces adapted for use as salt bath furnaces." O. Evans (Allgemeine Elektricitats-Ges.). July 22nd, 1933. (422868.)

21497. "Electric converting apparatus." British Thomson-Houston Co., Ltd. July 30th, 1932. (422713.)

22553. "Electrical connection simultaneously to two or more terminals." British Insulated Cables, Ltd., and G. H. Nisbett. August 12th, 1933. (422716.)

23033. "Electric lamps." G. Usmar. August 17th, 1933. (422799.)

23163. "Electric fuses." British Brass Fittings, Ltd., and G. N. Sperryn. August 19th, 1933. (422718.)

23317. "Electric imitation fires." Credenda Conduit Co., Ltd., and P. W. Davies. August 22nd, 1933. (422800.)

24635. "Electric water heaters or geysers." F. Goord and A. E. Elliott. September 6th, 1933. (422803.)

26726. "Variable inductances." General Electric Co., Ltd., H. C. Turner and G. R. Polgreen. September 28th, 1933. (422585.)

26982. "Electric discharge devices." Naamlooze Vennootschap Machinerieen-en Apparaten Fabrieken. November 12th, 1932. (422869.)

27061. "Use of contacts with periodically-broken direct electric currents." R. C. Watkins and G. H. Stiles. October 2nd, 1933. (422640.)

28088. "Vapour electric arc convertors." General Electric Co., Ltd., and E. Gallizia. October 11th, 1933. (422870.)

28636. "Loud-speakers." General Electric Co., Ltd., and D. A. Oliver. October 16th, 1933. (422724.)

28637. "Electric circuits including photo-electric devices." General Electric Co., Ltd., N. R. Campbell and G. T. Winch. October 16th, 1933. (Cognate application 8977/34.) (422725.)

28641. "Coreless induction furnace." Siemens & Halske Akt.-Ges. June 30th, 1933. (422726.)

28776. "Method of connecting an electrical rear-lamp to an electrical battery front lamp on cycles and like vehicles." W. F. Smith. October 18th, 1933. (422808.)

29329. "Electrical circuits including gasfilled electric discharge devices." General Electric Co., Ltd., and C. R. Dunham. October 23rd, 1933. (422809.)

30800. "Electric discharge devices." General Electric Co., Ltd., and L. C. Jesty. November 6th, 1933. (422728.)

30802. "Gasfilled electric discharge devices." General Electric Co., Ltd., and S. K. Lewer. November 6th, 1933. (422729.)

31576. "Automatic telephone and like selective systems." Siemens Bros. & Co., Ltd., and R. G. Dixon. November 13th, 1933. (422644.)

31806. "Electric couplings." J. E. Stewart and H. G. Campbell. November 15th, 1933. (422731.)

32347. "Electric cables." Siemens & Halske Akt.-Ges. November 23rd, 1932. (422647.)

32465. "Electrical conductors." London Electric Wire Co. & Smiths, Ltd., and E. L. Wildy. November 21st, 1933. (422733.)

33201. "Modulated carrier-wave systems." Marconi's Wireless Telegraph Co., Ltd. January 31st, 1933. (422650.)

34656. "Carbon-bow collectors for electric vehicles." E. Conradty and O. Conradty (trading as C. Conradty). January 30th, 1933. (422651.)

36010. "Electric power cables." Okonite-Callender Cable Co., Inc. December 21st, 1932. (422814.)

1934

356. "Electrical musical instruments." W. Nernst. January 4th, 1934. (Convention date not granted.) (422735.)

2984. "Electrical illumination control systems." British Thomson-Houston Co., Ltd. January 28th, 1933. (422657.)

3032. "Television and like transmitters." Marconi's Wireless Telegraph Co., Ltd. January 28th, 1933. (422658.)

3496. "Mechanical recording of oscillations." Philips-Miller Naamlooze Vennootschap. February 2nd, 1933. (422818.)

3517. "Electrical connections more particularly for electrolytic condensers." Elektrizitäts Akt.-Ges. Hydrawerk. February 8th, 1933. (422739.)

3721. "Ultra-short wave transmitting arrangements." J. Pintsch Akt.-Ges. and Dr. K. Kohl. February 8th, 1933. (422659.)

4363. "Electrically heated hair-waving appliances." Electricitäts Ges. Sanitas. February 9th, 1933. (Cognate application 4364/34.) (422820.)

8078. "Thermionic discharge tube voltage-regulators for direct-current generators." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 17th, 1933. (422604.)

9824. "Television receivers." Suddeutsche Telefon-Apparate-Kabel-und Drahtwerke Akt.-Ges Tekade. April 24th, 1933. (422752.)

10336. "Traffic signals." E. C. West. April 5th, 1934. (422755.)

10522. "Television and the like systems." Electric & Musical Industries, Ltd., P. W. Willans, W. S. Percival, E. L. C. White, and H. E. F. Osborne (legal representative of C. P. Osborne, deceased). April 13th, 1933. (Cognate application 3945/34.) (Divided application on 11204/33.) (422824.)

12186. "Magnet system for moving-coil measuring instruments." Siemens & Halske Akt.-Ges. April 22nd, 1933. (Cognate application 12187/34.) (422878.)

13424. "Clockwork-driven current impulse-transmitters for alarm installations." H. A. Gill (Elektrozeit Akt.-Ges.). May 3rd, 1934. (422673.)

14295. "Cathode-ray tubes." Fernseh Akt.-Ges. May 11th, 1933. (422614.)

15533. "Electric transformers." British Thomson-Houston Co., Ltd. May 24th, 1933. (422827.)

15794. "Electric radiators or heaters and hot-water or steam radiators or pipes." A. K. Waugh. May 28th, 1934. (422828.)

16036. "Electrical condensers." Marconi's Wireless Telegraph Co., Ltd. May 29th, 1933. (422677.)

16411. "Thermostatic electrical switches." British Thermostat Co., Ltd., and M. Payne. June 1st, 1934. (422883.)

17398. "Fusible conductors for high-tension cut-outs." British Thomson-Houston Co., Ltd. June 12th, 1933. (422762.)

19483. "Manufacture of non-circular insulated electric conductors and single-wire power cables." Cablon, Ltd. June 30th, 1933. (422687.)

20322. "Electric accumulators." Chloride Electrical Storage Co., Ltd., and B. Heap. July 11th, 1934. (422887.)

20908. "Electron-discharge tubes and incandescent electric lamps." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. October 23rd, 1933. (422833.)

22341. "Contact means for electrical heating apparatus." Koninklijke Fabriek Inventum Naamlooze Vennootschap. August 2nd, 1933. (422836.)

23171. "Electric resistance heaters." British Thomson-Houston Co., Ltd. August 12th, 1933. (422893.)

25213. "Operation of what are known as frog-switches in tramway or trackless trolley systems." Forest City Electric Co., Ltd., and S. T. Quilliam. September 1st, 1934. (422623.)

25342. "Oxide cathodes, more particularly for gasfilled discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. September 14th, 1933. (422694.)

26338. "Electric switches for alternating current." Siemens-Schuckertwerke Akt.-Ges. September 13th, 1933. (422775.)

26821. "Apparatus for driving clocks, time switches, and the like." Landis & Gyr Akt.-Ges. September 22nd, 1933. (422776.)

27116. "Apparatus for the electrical precipitation of suspended particles from gases." Lodge-Cottrell, Ltd. (Research Corporation of New York.) September 20th, 1934. (422777.)

27983. "Vibration translating devices." Electrical Research Products, Inc. October 4th, 1933. (Cognate application 29124/34.) (422695.)

28579. "Electric discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. November 4th, 1933. (Addition to 392796.) (422897.)

28581. "Protective arrangements for wattless current-compensated electric machines." British Thomson-Houston Co., Ltd. October 5th, 1933. (422839.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from February 6th:—

DriHite (lettering and design). No. 556750. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—British Driver Harris Co., Ltd., Gaythorn Mill, Albion Street, Manchester.

Challenger. No. 556958. Class 8. Electric batteries and accumulators (not for medical purposes).—Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester.

Forjan. No. 556136. Class 13. Electrodes of ordinary metal for electric arc welding.—E.M.F. Electric Co., Proprietary, Ltd., Melbourne, Australia. (British representatives: Abel & Imray, 30, Southampton Buildings, Chancery Lane, W.C.2.)

Plioston. No. 555797. Class 50. Artificial resins sold in solid pieces and as moulding powders and articles made therefrom.—Albert Products, Ltd., 173-207, West Street, Erith, Kent.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdovey.—Houses (20); H. E. Davies, U.D.C. surveyor.
Aldershot.—School (£25,289) for Borough E.C.; F. Le Clerq, builder, Farnham.
Amesbury.—Houses (100); A. M. Wilson, R.D.C. clerk, 93, Crane Street, Salisbury.
Annan.—Houses, Waterfoot Road (electrical work); Alex. MacLennan, burgh surveyor.
Balderton (NOTTINGHAMSHIRE).—Mental institution (£218,000); E. G. Phillips, consulting engineer.
Billingham-on-Tees.—Houses (120), Cowper Lane; Kitching & Co., architects, 21, Albert Road, Middlesbrough.
Bilston.—Extensions, Fraser Street schools (£19,229), for Borough E.C.; education architect.
Birmingham.—Houses (700), Cherry Orchard Estate, Handsworth Wood, for the Ideal Benefit Society, Pitmaston; R. O. Warder, architect, Pitmaston, Birmingham, 13.
Blaby.—Houses (1,000), Enderby Estate, Narborough Road, Blaby; B. W. Cole, Bridge Road Works, Leicester.
Blackpool.—Schools and extensions (three years' scheme, £120,000), for Borough E.C.; director of education.
Bolton.—Houses (174), Entwistle Street Estate, by direct labour (£50,400); borough engineer. Houses (38), Great Marld Estate; W. Townson & Sons.
Bootle.—Houses (110), H.M. prison site, Walton (£34,650); Leyland Construction Co., Ltd., Leyland.
Brandon (Co. DURHAM).—Houses (288); J. P. Addison, architect, Council Offices.
Brighton.—Business stores (£100,000), for the International Stores, Ltd., Mitre Square, London, E.C.3; J. S. Beard, architect, 101, Baker Street, London, W.
Bristol.—Secondary school, Downton Road, Bedminster; W. H. Watkins, architect, 1, Clare Street. Council school, Fonthill Road, Southmead; C. H. White, architect, 47, College Green. Extensions to Ham Green Hospital (£43,925); city engineer.
Burton-on-Trent.—School, Clarence Street, for Borough E.C.; Home & Knight, architects, 3, Verulan Buildings, Gray's Inn, London, W.C.
Carlisle.—Houses, Morton Estate; J. Laing & Son, Ltd.
Chatham.—Houses (56), New Horsted; borough surveyor.
Chertsey.—Houses (94), Addlestone, for A. W. Sheppard.
Cheshire.—Senior schools, Hudheath (£28,637), for County E.C.; F. A. Browne, county architect, Chester.
Chippenham.—Houses (96); Housing Committee.
Coatbridge.—Cinema (£20,000) for the Scottish Cinema and Variety Theatres, Ltd., 105, St. Vincent Street, Glasgow.
Conisbrough.—Houses (100); H. Thirlwall, R.D.C. surveyor.
Cookley.—Houses (200), Castle Road; Clarke & Stillito, estate agents, Coventry.
Corby.—Hotel (£30,000); Gotch & Saunders, architects, High Street, Kettering.
Coventry.—Schools, Hen Lane, for Borough E.C.; director of education.
Dagenham (ESSEX).—Houses (74), Mill Park Estate; U.D.C. surveyor.
Darwen.—Houses (63), Hollins Grove Street; borough surveyor.
Devonshire.—School, Crownhill, Plymouth; County architect.
Doncaster.—Houses (73); O. Weaver, builder, Mexborough.
Durham.—Council school, Spennymoor Four Lane Ends; E. Willey, county architect, 34, Old Elvet.
Easington.—Houses (263); C. W. Clarke, surveyor.
East Ham.—Houses (27), Gainsborough and Landseer Avenues; R. J. Slater, architect.
Ebbw Vale.—Houses (28), Glyncoed; P. I. Davies, U.D.C. surveyor. Senior school, Glyncoed, for E.C.; G. H. Davies, architect, 12, Cross Street, Abergavenny.
Eyemouth.—Houses (28), electrical work; burgh surveyor.
Fareham.—Houses (109); U.D.C.
Gillingham (KENT).—Town hall and municipal offices (£85,000); borough surveyor.
Glasgow.—Houses, Herries Road and Shawmoss Road, Pollokshields; Wm. S. Gordon & Co. Houses, Dunsmuir Street, Hillington Park, and Possil Road; also school, Albert school site; city engineer. Telephone exchange, Traquair Drive, Cardonald; H.M. Office of Works. Extension to workshops, Possilpark (£45,000); city architect.
Gloucestershire.—Extensions to school, Chipping Sodbury (£20,000), and Kingswood and Lydney (£13,000), for County E.C.; director of education, Gloucester.
Halstead (ESSEX).—Houses (40); U.D.C. surveyor.
Havant and Waterloo (HANTS).—Houses (50), Emsworth; U.D.C. surveyor.
Hoyland (YORKS).—Houses (200), Market Street; U.D.C. surveyor.
Hull.—Senior department, Cavendish Road School; city architect.
Ilkeston.—Isolation hospital; borough engineer.
Keighley.—Houses (28), Florist Street; H. Procter.
Kimbolton.—Extensions, including laboratory and assembly hall, Grammar School, for the Governors; T. H. Longstaff, architect, Huntingdon.
Kingston-on-Thames.—Extensions to County Hall (£146,000); E. Vincent Harris, architect.
Kirkcaldy.—Cinema (£40,000); manager, Kirkcaldy Entertainments, Ltd.
Lanarkshire.—Houses (60), Eastfield, Harthill, for C.C.; county architect, Renfield Street, Glasgow.
Lancashire.—Schools, Grammar School site, Accrington; county architect.
Lancaster.—Houses (120), Willow Lane Housing Estate; Frederick Hill, borough surveyor, Town Hall.
Leeds.—Houses, Ivy Street, York Road, &c.; Wm. Jowett. Houses, Landseer Avenue, Bramley; Barker & Cheer. Houses and flats, Lea Farm Road, Osmondthorpe Lane, Westfield Estate, and tramway and motor bus depôt, Lupton Avenue and Torre Road (£60,000); city engineer, Civic Hall.
Leicester.—Extensions to Domestic Science Training College, Knighton Fields (£39,970); J. O. Thompson, surveyor, Education Dept., Newark Street.
Littlehampton.—Cinema, café, &c., at the corner of Maltravers Road and Fitzalan Road, for F. Iler, proprietor of the Palladium and Regent Cinemas.
Liversedge.—Houses (32), Lumb Lane and Huddersfield Road; S. Drake & Sons, builders.
London. — (SOUTHWARK). — Tenements, Walworth Road (£85,000); L.C.C. architect.
Luton.—Houses (60); H. Pickering, R.D.C. surveyor, 73, West Parade, Dunstable.
Manchester.—Houses, Emmett Street, Belle Vue, Wythenshawe (£401,051), and flats, Collyhurst and West Gorton sites (£813,525); city engineer. Flats (204), Kirkmanshulme Lane, Gorton; G. & J. Seddon, Ltd., Bolton.
Marlow.—Houses (38), Seymour Court Road; Canning & Sergeant.
Merthyr Tydfil.—Houses (62), Galon Uchaf; T. R. Jones, builder, Abertridwr.
Middlesbrough.—Extensions to Holgate Hospital; S. E. Burgess, borough engineer.
Motherwell.—Houses (136), (£41,000); burgh surveyor.
Newark-on-Trent.—Cinema, London Road, for Newark Cinemas, Ltd.
Newcastle-on-Tyne.—Houses for C.C. (£200,000); R. G. Roberts, housing architect, 18, Cloth Market. Cinema, Heaton, for J. McHarg, Wallsend; Marshall & Tweedy, architects, Pilgrim Street. Factory for the Co-operative Society (£100,000).
Newport (I.O.W.).—Houses, Gunville; borough engineer.
Norfolk.—Schools, Hellesdon, and Old Buckenham, for County E.C.
North Riding.—School, Sandybed Estate, Scarborough; county surveyor.
Northumberland.—School, Shiremoor; county architect.
Nottinghamshire.—School, Cavendish Road, Carlton (£27,000); county architect.
Paisley.—Houses (160); burgh surveyor.
Penmaenmawr.—Houses; U.D.C. surveyor.
Pershore.—Houses (50); R.D.C. surveyor.
Plymouth.—Development scheme to foreshore (£41,000); city engineer. School; R.C. authorities, St. Budeaux.
Pontefract.—Houses (102), Monkhill Estate (£31,845); Thomson & Dixon (Doncaster), Ltd.
Portsmouth.—Flats, Highland Road, Eastney; E. & A. Sprigings.
Retford.—Houses (100), Dog Kennel Lane; J. H. Edwards, 48, Netherton Road, Worksop.
Ross (HEREFORDSHIRE).—Houses (70), Tudorville Estate; U.D.C. surveyor.
Rotherham.—Two schools and clinic (£25,500), and extensions to Isolation Hospital (£21,200); borough engineer.
St. Leonards-on-Sea (SUSSEX).—Houses (32), Glen Road, for Nu-Homes, Ltd.; C. H. King, architect.
Salford.—Flats (128), Eccles New Road (£64,900); William Gornall & Sons, Ltd.
Scarborough.—Houses (208), Northstead Estate (£65,000); Mollikin Bros. Alterations to Arcadian Restaurant, Foreshore Road, for the Catlin's Entertainments, Ltd.; Jones & Rickaby.
Southampton.—School (700 places), Bassett Green, and grammar school for girls, for Borough E.C.; Mr. Freeman, secretary.
Southsea.—Craneswater Palace Hotel (£135,000), with electrical work; Buckland & Heywood, architects, Birmingham and London.
South Shields.—Extensions to the Co-operative Society premises; F. W. Newby, architect, 37, King Street.
Stalybridge.—Houses (76), Harrison Street and Cambridge Street (£23,562); borough engineer.
Stow-on-the-Wold.—Houses (25); U.D.C. surveyor.
Stretford.—Cinema, Edge Lane; Jackson & Newport, Ltd.
Stroud.—Houses (78), Spider Lane; U.D.C. surveyor.
Sunderland.—Houses (488), Ford Estate; borough engineer.
Surrey.—Hospital, St. Helier, and school, Chipstead, Hackbridge, and Woodmansterne; county surveyor.
Swaffham.—Houses (50); U.D.C. surveyor.
Torquay.—Library and public offices; borough engineer.
Tunbridge Wells.—Motor showrooms and works, electrical work, Mount Pleasant and Church Road, for J. Rawson & Sons.
Wakefield.—Houses (100), Lupset Estate; city engineer.
Walthamstow.—Houses (70), Chestnuts Farm; borough engineer.
Ware.—Houses (28), Fanhams Road; R. W. Granton, U.D.C. surveyor.
Warwickshire.—Senior schools (700 places), Stratford-on-Avon, for County E.C.; director of education, Leamington Spa.
Wednesbury (STAFFS).—Houses (148), Crankhall Lane Estate; A. M. Griffiths & Son, Ltd., builders, Thomas Street, Wolverhampton.
West Riding.—School (300 places), Bentley-with-Arksey, for County E.C.; director of education, Wakefield.
Wiltshire.—Senior school, Upper Stratton, for County E.C.; director of education, Trowbridge.
Wolverhampton.—Houses (43), Warstones Road; A. M. Griffiths & Son, Ltd.
Worthing.—Houses (25), Ham Way, for F. W. Payne & W. A. Linfield; H. M. Potter, architect. Hotel, Grand Avenue (£30,000), for Ivor Douglas Langhorne, 17, Berkeley Square, London; H. Osborne, architect, Chichester. Additions to 48/50, South Street; J. Lyons & Co., Ltd.
Wyken (COVENTRY).—Houses (1,200), for the Economic Estates Co., 2, Stoneleigh Terrace, Coventry; G. A. Steane, architect.